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**THE ABUSE OF THE  
SINGING AND SPEAKING VOICE**





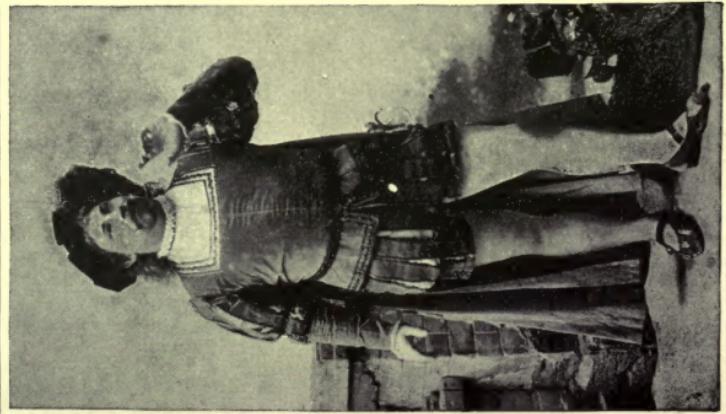
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TYPE OF SECOND TENOR



FIG. 9

TYPES OF STRONG TENOR



# THE ABUSE OF THE SINGING & SPEAKING VOICE

## CAUSES, EFFECTS, AND TREATMENT

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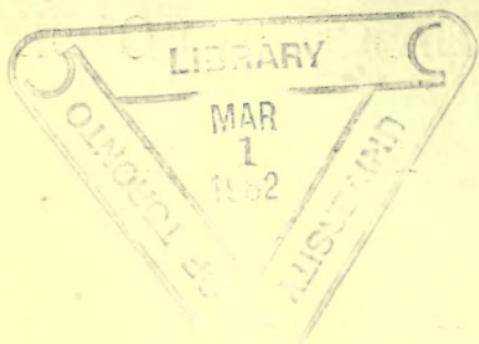
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## TRANSLATOR'S PREFACE

THERE are numerous Teachers of Singing and Declamation in the British Islands who are daily teaching pupils, some of them by methods which are undoubtedly faulty, judging by the spoiled voices which come under the notice of the laryngologist. The causes of the abuse of the singing and speaking voice are so clearly expressed by Professor Moure and Dr Bouyer *fil's* in their joint report, that I feel the excellent advice which it contains should be made accessible to all who use, or teach the use of, the voice, be they singers, professors, orators, actors, or school teachers. I have, therefore, translated this little work in the hope that it may be of use not only to those whom I have enumerated but to laryngologists as well.

I have to thank the authors for according me permission to translate their work—a labour which has been a sincere pleasure. I also owe thanks to Mr J. Westrope for several useful suggestions,

## TRANSLATOR'S PREFACE

and to Mr H. A. Keyser, A.R.C.M., for valuable help in dealing with those parts in which a knowledge of music was essential.

MACLEOD YEARSLEY.

59 QUEEN ANNE STREET, W.,  
*May* 1910.

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## INTRODUCTION

WHEN we undertook this report upon that special physiological disturbance to which has been given the name of *vocal abuse*, we considered it necessary to study it in those whose profession demands, so to speak, a methodical and systematic yield from their apparatus of phonation, and we recognised that the adaptation of this apparatus was nearly the same for singers as for speakers (preachers, advocates, tragedians, teachers, etc.). Also, it appeared to us indispensable to consider, in a general way, in this study, the putting into action of the vocal organisation appropriated not merely to the requirements of ordinary speech and of conversation, but to the exigencies of the art of singing and of declamation.

We shall divide our report into six parts :

I. In the first we shall give an historical sketch of the teaching of singing during different periods to show thoroughly that it contains to-day the same empiricism as in the past. The study of this part of the history of singing has, however, been singularly facilitated for us by the reading of a

## INTRODUCTION

book, now unobtainable, by MM. Lemaire and Lavoix,<sup>1</sup> from which we have borrowed part of our information.

II. Next we shall explain succinctly the organisation and normal function of the phonetic apparatus, in order to make better understood in what abuse consists, in order also to show what actual scientific data are sufficient to guide vocal training.

III. After having defined what should be understood by the term *abuse*, we shall describe its physical causes brought about by the use of an instrument rendered defective :

- (a) By malformation or pathological alteration.
- (b) By anatomical disproportion between its various constituent parts.
- (c) By a loss of organic ability to the yield demanded.

IV. Then we shall analyse the functional causes of abuse by thus classifying them :

1. Similar compass, similar yield required from all voices classed in the same category.
2. Different and varying yield required from one vocal apparatus (misplacement or alteration of range of voice).
3. Defective use of the breathing.

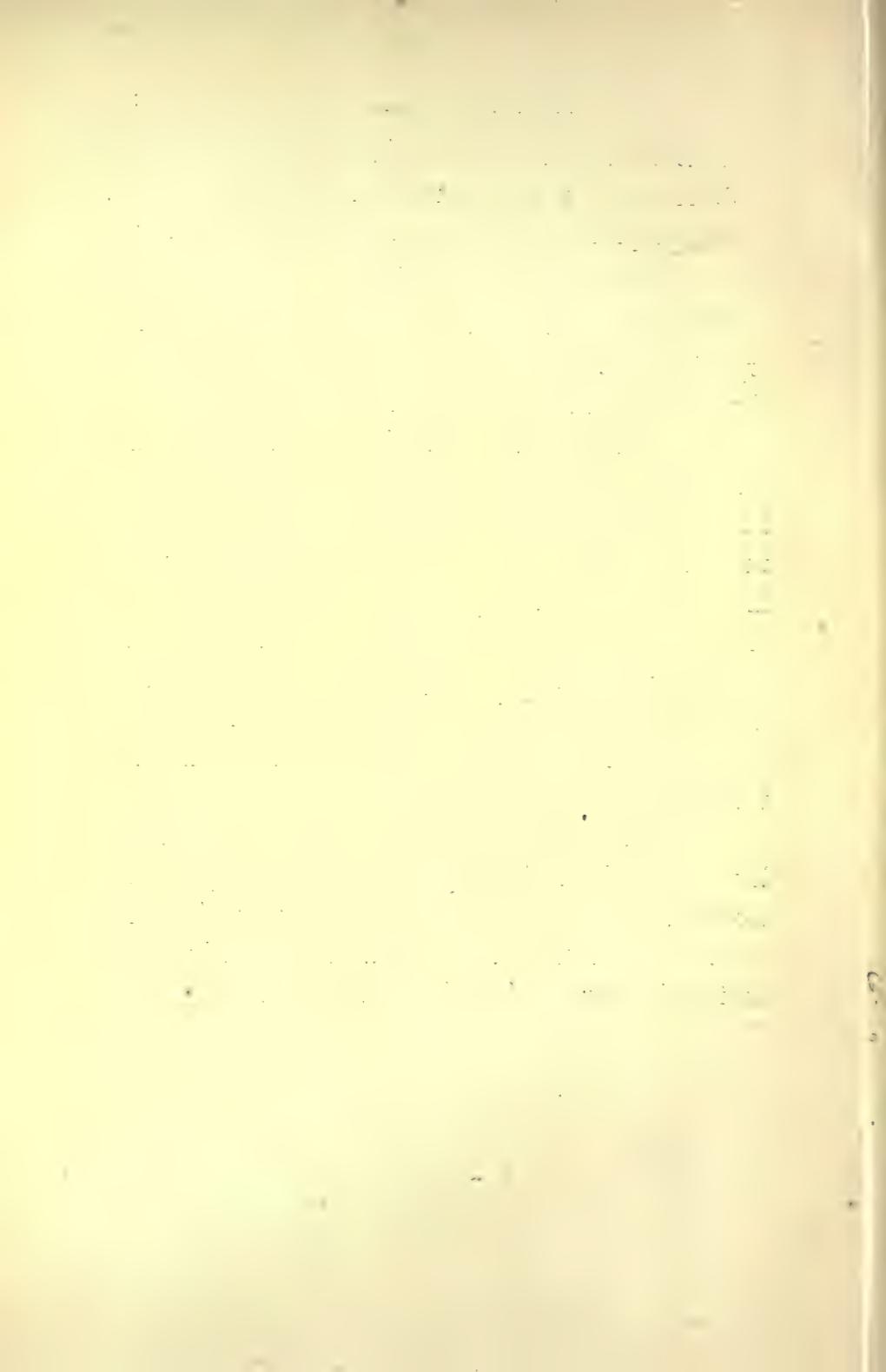
<sup>1</sup> LEMAIRE and LAVOIX, *Le chant, ses principes et son histoire*. Paris : Heugel, 1881.

4. Defective attack of the note.
5. Abuse of the chest register.
6. Complete yield of the vocal apparatus without adequate impulse.

V. We shall briefly enumerate the functional and organic disturbances which are the consequence of abuse both with the singer and the orator.

VI. Certain therapeutic indications will end this work, when, for greater clearness, we shall follow it with practical conclusions which appear to us to arise from our statement, with an appendix in which we shall reproduce the various classes of singing voices established by custom. In this matter we thank M. Téqui, professor of singing in Paris, for the valuable information with which he has been good enough to furnish us on this technical part of our work.

Our task will be fulfilled and our object obtained if we succeed in showing that it is indispensable for singing masters and their pupils to make sure of the collaboration of the laryngologist within the limits which we shall endeavour to define.



# THE ABUSE OF THE SINGING AND SPEAKING VOICE

## CHAPTER I

### HISTORICAL SKETCH ON THE TEACHING OF SINGING

FROM the information given by the ancient historians, it appears that the first regulations for the teaching of singing must be assigned to the time of the Roman emperors. At this epoch three kinds of professors existed at Rome in charge of the development of the voice: the *vociferarii*, who occupied themselves with its intensity and extent; the *phonasci*, to give it various adornments; lastly, the *vocales*, who perfected its suppleness and flexibility.<sup>1</sup> The exaggerated precautions which Nero took regarding his voice may give an idea of the hygiene of the singers of this period: "At night, Nero lay on his back with a thin sheet of lead on his stomach. He purged himself with clysters and emetics; he abstained from fruit and all the dishes which could harm the voice; for fear of altering the notes he ceased to

<sup>1</sup> According to the information of Dr CASTEX, in his *Hygiène de la voix parlée et chantée*.

harangue the soldiers and the senate. He even kept near him an officer to take care of his voice ; he no longer talked save in the presence of this singular governor, who warned him when he spoke too high or when he forced his voice, and if the Emperor, carried away by some sudden passion, did not listen to his remonstrances, he made him close his mouth with a napkin.”<sup>1</sup>

*In the Middle Ages and up to the thirteenth century* the plain-chant ruled all music, and the Church was the first educator of singers, thanks to the creation of free institutions. Gregory the Great founded at Rome, under the name of “Æphonotrophium,” two schools where the plain-chant was taught ; they were situated one at the foot of the steps of St Peter, the other in the vicinity of the Lateran. The pupils lived there in common with their chiefs, called deans or precentors. Jean Diacre, the historian of Gregory, reports that this pontiff did not disdain himself to teach singing to children, and adds that the bed was shown at Rome on which he sat when working with his pupils, with the antiphonary (collection of chants for the office and anthems) which he used and the whip with which he menaced them. These were the real nurseries of masters who carried to Europe the traditions of the Roman

<sup>1</sup> GINGUENE, *Encyclopédie méthodique*.

chant. Adrian I. sent to Charlemagne two of his most illustrious precentors, Theodore and Benoît, who established at Soissons, Metz and Troyes the first great free institutions. Under the guidance of such chiefs the plain-chant rapidly developed ; it was ornamented with variations and flourishes, and was the florid plain-chant which demanded of its interpreters a perfect vocal science. The trills, shakes, tremillos and vinulæ<sup>1</sup> were so many graces on which the pupils were patiently exercised. The poets sprung from these schools had acquired a real elegance, and Féétis<sup>2</sup> tells us that the Bard Gallois, who wished to be received into the category of these singers, had to know thirteen styles of expression. The falsetto voices were long most sought after and specially cultivated, but the legislators of ecclesiastical discipline ended by condemning them in monks. Bass voices were equally, at a certain period, the most prized up to the day when Théodulph, Bishop of Orléans, condemned them as having corrupted by their bellowings (*voces taurinae*) the purity of the plain-chant.

*In the fourteenth century the florid plain-chant is deprived of its ornaments and gives place to a*

<sup>1</sup> The shades of the plain-chant of this period and its variations have been recovered from a MS. deposited at the Abbaye de Saint-Gall, and written by the Monk Balbulus Nokter.

<sup>2</sup> FÉETIS, *Histoire générale de la musique* (Paris, 1876).

## HISTORICAL SKETCH ON

most severe new interpretation, laid down by the bishops, who wished thus clearly to separate religious from profane music. St Bernard had decreed this method of singing in his statutes of the Order of Cîteaux: "It is necessary," he writes, "that men sing in a virile manner and not with high and factitious voices like the voices of women"; and he adds, "singers should try not to sing through the nose, to use their respiration and not to shout excessively."

*In the sixteenth century* the appearance of the madrigal and of a more complicated harmonic science brought with it difficulties of vocal interpretation till then unknown.

The Italian school of elegance was founded at this period.

The first Conservatoire was created in 1537 by Jean de Tapia, who wished to perpetuate, by means of this institution, the good principles of the chant. Resources failing him, he went bravely begging from town to town, and it is with the produce of his alms that the Conservatoire, Santa Maria di Loreto, was able to be founded at Naples. The Viceroy and the President of the Consistory subsidized this foundation. The other towns of Italy were rapidly covered with similar new schools. Illustrious masters like Zarlino and Céronne there cultivated with the greatest care the

voices of the pupils, at that time charged with interpreting the compositions of Palestrina. They recorded in real tracts their wise teachings, and in the *Il Melopeo* of Cérone<sup>1</sup> one finds the following curious recommendations to the "singer prudent and desirous of keeping his voice": to avoid forcing when commencing to sing, so as not to fatigue the lungs,—not to sing too high nor too low,—to use plenty of exercises and vocalisations, eat only light things, and abstain from almonds, filberts and nuts, which dry the chest.

The seventeenth century is marked in Italy by the appearance of eunuchs, those "kings of elegance," who really created the *bel canto*, who during more than two centuries must give the first rank in music to the Italian school. Their origin goes back to a period much more remote, since in 1137 a Greek eunuch, named Manuel, organised the study of singing in Russia, at Smolensk, and that in 1569 the Duke of Bavaria had already eunuchs in his chapel. But it is in 1640 that we see them take the first place in the church, the theatre and the concert. They came to replace in the pontifical chapel the Spanish *falsetti*. They began music very young, and only came to the first vocal studies after being trained to all the difficulties of reading. These voices, mostly

<sup>1</sup> CÉRONE *Il Melopeo* (Naples, 1613).

soprano or contralto, lasted a very long time. The eunuch Matteuci still sang the religious offices at eighty years of age, and "his voice," Mancini<sup>1</sup> tells us, "was so clear and fresh, he sang with such flexibility and lightness, that those who heard without seeing him believed he was a young man in the flower of his age."

Venice was at this period the rendezvous of the most celebrated eunuchs and singers, who came there to interpret the first operas. The *Mercure de France* possessed, at the end of this century, a correspondent who wrote : "The Venetians get the best male and female voices, begging even the princes to whom they belonged to let them come, and not pleading the expense on this occasion, however heavy this may be ; at the present time there is one to whom four hundred Spanish pistoles were given, without travelling expenses ; the women understand music to perfection there, using their voices admirably, and have a certain way of shaking, of cadences, and echos, which they direct and vary as they like. This is so pleasing that, from the moment they have finished some great air, or when they leave the theatre, the *barcarols* (gondoliers), and even many very considerable persons, cry with all their might, 'Viva bella,

<sup>1</sup> MANCINI, *Réflexions pratiques sur le chant figuré*. Translated by Ragueval (Paris, year III.).

viva ah cara, sia benedetta ! ” This public favour for female singers even ended by drawing to the scene women destitute of talent, and Tosi, in his book *l'Art du Chant*,<sup>1</sup> inveighs severely against the introduction of similar manners : “ Messieurs les Maitres, the best voices are no longer heard in Italy as one formerly heard them there, particularly amongst the women. For the confusion of the guilty, I will tell the reason ; ignorance does not allow parents to recognise the faults of their daughters' voices and the misery coming to those who believe that to sing and to become rich are one and the same thing ; they imagine that to learn music it is enough to have a pretty face ; can you instruct them ? You can perhaps teach those for whom song . . . modesty does not allow me to go further.”

The Italian conservatoires were at this period in full prosperity. The time of the students there was regulated hour by hour. Bontempi, in his *Histoire de la musique*,<sup>2</sup> has left us curious details of the material organisation of the Roman schools : “ Three hours daily were appropriated, the first to trills, the second to transitions, the third to the study of turns. During another hour the pupil

<sup>1</sup> TOSI, *Art du chant*, 1723. Translated from the Italian by Lemaire (Paris : Rothschild, 1874).

<sup>2</sup> BONTEMPI, *Istoria musica* (Perusa, 1695).

worked under the direction of the master, who took care to place before him a mirror in order that he might habituate himself to make no movement, in singing, of the eyes or forehead. He went next to the Angelica gate, and there sang within reach of an echo which returned the sound, allowing the singer to judge his voice."

In France, during the whole century, the free institutions underwent considerable development, taking the place of conservatoires, until the day when Lulli, founding the Opera, joined thereto a school of singing and declamation.

*The eighteenth century* is the golden age of song in Italy. The taste of the singers reaches its apogee. During this period every musical composition is adapted to the human voice in order to make it as conspicuous as possible. Operas are written for the eunuchs that include at this period the illustrious masters Porpora, Hasse and Scarlatti.

The study of singing was particularly laborious and prolonged, if one may judge of it by the example of the celebrated eunuch Cafarelli, who only reached the theatre after a long apprenticeship directed by Porpora. The latter exacted from his pupil a complete submission, and the promise only to go upon the stage when he considered his instruction complete. It was only at the end of six years of study of the same trills and the same

gruppetti that the master said to his disciple, "Go, my son, thou hast nothing more to learn, thou art now the first singer in Italy or in the world."<sup>1</sup> This is the period of the eunuchs Farinelli, Guardagni, and the celebrated female sopranos Faustina, Cuzzoni, etc.

In France our singers begin to seek the expression and intelligence of performances and scenic display. The end of this eighteenth century became illustrious by the celebrated Dugazon, the Gavaudans, the tenor Elleviou, the baritone Martin, and the famous Professor Garat, who prepared all the star singers at the beginning of the following century—Roland, Nourrit, Ponchard, Levasseur. "The pupil," wrote Lemaire and Lavoix, "should come to him well versed in the material part of song, but then he found an incomparable master of taste, warm and intelligent, loving his art and his pupils." In 1795 the Conservatoire was founded by the Convention, which designed it to teach music to six hundred pupils of both sexes chosen proportionately in every department.

*In our time* it is incontestable that reform is prominent in the teaching of singing. The discovery of the laryngoscope, the complete knowledge of the anatomy of the apparatus of phonation,

<sup>1</sup> According to LEMAIRE and LAVOIX, *Le chant, ses principes et son histoire* (Paris, 1881).

## 10 HISTORICAL SKETCH ON

the physiological data as to its function, are so many relatively recent acquisitions, which should bring us valuable indications in the method of training the voice. Unhappily, as in the past, professors and pupils are most often unacquainted with the structure and essential mechanism of the vocal instrument. Garcia<sup>1</sup> and Bataille<sup>2</sup> have nevertheless traced in their treatises on singing a new path inspired by the indications drawn from laryngoscopy ; but since the too much unknown and already forgotten works of these masters, we have again fallen back into the old errors. Nevertheless a growing tendency to modify this state of things appears to make its way progressively ; it is thus that we see professionals themselves demanding this change. Crosti,<sup>3</sup> in 1893, in his *Gradus du Chanteur*, asks for a regulation of the professoriate, founded on the creation of a diploma of guarantee, obtained before becoming a singing master. But the real point of view which interests us has been specially considered by Victor Maurel, in his book *Problème d'art*.<sup>4</sup> This artist and author writes : "At the head of all technical instruction, such as

<sup>1</sup> GARCIA, *Observations physiologiques de la voix humaine* and *Traité de l'art du chant* (1861).

<sup>2</sup> BATAILLE, *De l'enseignement du chant* (Paris, 1863).

<sup>3</sup> CROSTI, professor at the Conservatoire.

<sup>4</sup> VICTOR MAUREL, *Un Problème d'art* (Paris : Tresse et Stokes, 1893).

it has been practised up to now, in the vocal art, should be inscribed a word which sums up and explains all the criticisms which it is right to address to this teaching : *Empiricism.*" And putting the question of his problem on these lines, "How to put the phonetic organs in condition to give all the effects of which the vocal art is capable," he thus sums up the solution : "Our many and patient researches have brought us to the very clear conviction that this solution can be offered to art by physiological science." In the same order of thought, Lili Lehmann,<sup>1</sup> a German singer, writes, according to the translation which Dr Mérel has kindly given us : "One does not speak enough of the sciences to the singer ; one does not tell him enough of the physiological phenomena of song, which should, nevertheless, guide him— For all who wish to become artists, it will be very important to begin not by practical exercises, but by serious studies in the production of sound, on respiration, the function of the tongue, etc."

Finally, quite recently, our confrère Pierre Bonnier,<sup>2</sup> in his very interesting study on the cultivation of the voice, particularly insists, with a clinical argument in support, on the necessity of

<sup>1</sup> LILI LEHMANN, *Meine Gesangskunst* (Berlin : Verlag der Zudunft, Fried. Str., 1902).

<sup>2</sup> *La voix, sa culture physiologique* (Alcan, 1907). Conférences held at the Conservatoire of Music.

## 12 THE TEACHING OF SINGING

developing this function according to scientific data. "At each lesson," he says to the pupils, "you work at practical physiology and you obey physiological rules which you cannot miss without suffering for it forthwith. There is, therefore, an immediate interest for you in knowing them."

It is these laws, and the omissions in these rules, with their pathological consequences, which we shall demonstrate in the following chapters, considering them in all voice professionals.

## CHAPTER II

### ORGANISATION OF THE PHONETIC APPARATUS

#### A. GENERAL FUNCTION

ALTHOUGH the phonetic apparatus may be an instrument sufficiently well known to most specialists, nevertheless it appears to us indispensable to recall here its schematic description, which will help us better to explain and especially better to classify the different methods of vocal abuse.

Without wishing to make a complete comparison, which is evidently not possible in itself, even as all physiologists and physicians who are occupied with the delicate and complex question of phonation have recognised, one can, notwithstanding, compare the vocal apparatus to a wind instrument. Thus one can recognise in it: a bellows, a wind-pipe, a reed, and resonators. We shall pass briefly in review the different parts of this apparatus, pointing out the importance and relations thereof.

1. *Bellows*.—The bellows, in itself, is no other than the pulmonary organ considered no longer in its chemical and blood functions, but in its

mechanical aspect. Bronchi, bronchioles and pulmonary alveoli then appear to us as a real reservoir of air capable of being refilled and of emptying itself alternately, not only by means of its own elasticity, but especially by the movements of extension and compression of the bony wall which surrounds it : the thoracic cage.

We know that its refilling is accomplished by reason of the action of the ordinary inspiratory muscles, with the supplementary intervention of the extraordinary muscles which functionate little during ordinary normal respiration (sterno-mastoid and trapezius especially).

These inspiratory muscular contractions enlarge the cavity of the thorax in its three diameters ; the fact of it has been long known and demonstrated, and one knows by experience that it is especially in the antero-posterior, transverse and vertical directions that this enlargement occurs. In such wise as the reservoir is filled either at its base, its lateral part, or its summit, so is respiration diaphragmatic, inferior costal (costo-diaphragmatic of Joal), or clavicular.

Let us hasten to add that if the predominance of one of these respiratory types can be admitted during forced respiration, it is nevertheless impossible to dissociate them in a way complete enough to suppose that one of these types is accomplished

solely to the exclusion of all the others ; it must be understood once and for all, therefore, that when we speak of one of these respiratory types artificially created for the wants of the cause, the reader should keep well in mind the preceding observation.

The evacuation, or expiration, is a phenomenon essentially active. It is a play of air which is superadded to the passive elastic expulsion of the pulmonary tissues. It is produced by the muscles called ordinary expiratories, and regulated by the continuation of the contraction of certain inspiratories, especially by the progressive detaining action of the sterno-mastoids, which diminish and graduate the expiration of the breath.

It is necessary to remember that the volume of air employed does not correspond exactly to the contents of the reservoir. We know, as a matter of fact, that, on account of an imperfect vacuum, part always remains at the bottom of the apparatus (residual air) ; further, the supply varies with the demand ; the ordinary chemical respiration, in fact, only utilizes the necessary air (tidal air), keeping a reserve (reserve air), which is superadded to the residual air impossible to be put in motion. Always, when in singing a strong blast of air is indispensable, a more or less forced inspiration can make a supplement (supplemental air) enter the

lungs, and in a strong and sustained expiration the reservoir is capable of yielding at the same time its tidal air, that in reserve, and the supplemental air which has been absorbed, by the simple effort of the will. This is what may be called, with the physiologists, the vital capacity of the pulmonary reservoir.

We can deduce from the above that respiration during singing is a voluntary physiological act, from this fact susceptible of being modified according to each requirement. It is therefore possible to use, either simultaneously or separately, in the limits indicated above, each of the types of respiration that we have mentioned.

The method of replenishment, and especially of progressive and methodical distribution of the air contained in the lungs, enters largely into the art of singing and modulating the notes.

2. *Wind-pipe and reed*.—The column of air thus driven, with variable tension, is conducted by the wind-pipe, *i.e.* bronchi and the trachea, up to the larynx, where it throws into vibration a quite special reed, composed of two elastic membranes or inferior vocal cords; these latter are formed by a muscle (thyroarytenoid), a ligament, and mucous membrane. These cords are, further, endowed with two remarkable properties, one which permits of

their altering their degree of consistence and tension in length and thickness; the other lying in the possibility of modifying, by a complex dissociation, the extent and seat of their vibrating surface. It is thus that the singer can allow either the whole mass of the vocal cords or only their edge and mucosa to move.

As we have just pointed out *à propos* of respiration, we do not admit an absolute dissociation of the vibrating part of the vocal cord, but a simple marked predominance of vibrations in one of their glottic surfaces.

Owing to the movements of adduction and abduction regulated by a group of constrictor and dilator muscles, the vocal cords form between them a glottis of variable aperture, a real lock for the passage of the breath.

Without entering into the inner domain of phonation, which is, moreover, still somewhat inexact and undetermined, let us be content, for practical purposes, with knowing that there exists, between the tension of the cords and the passage of the breath, a synergic action of reciprocal accommodation and even of substitution. The intensity and the height of the sound depend the one on the amplitude of the vibrations of the vocal cords, the other on their number as well as on the rapidity, volume and pressure of the expelled air. It is the

assertion of the intimate association of the bellows and the reed.

3. *Resonators and Speaking-trumpet.*—The fundamental note produced at the level of the glottis would be obviously more tenuous and would have much less strength if it was not reinforced by the resonators, as in most musical instruments. Here we may consider that there are two systems of resonators, one below, constituted by a sounding-board of considerable area, comprising the lungs, trachea, and thoracic cage; the other above, formed by the whole series of closed cavities scattered in the cranium and face (maxillary, frontal and sphenoidal sinuses, ethmoid cells), or inter-communicating and situated on the course even of the sound waves (ventricles of the larynx, pharynx, nasopharynx, nasal fossæ, mouth cavity). These various resonators, owing to the mobility of their wall, to their form and size, can contribute indifferently to strengthen the harmonics and form the vowels. The sound waves striking against obstacles (soft palate, tongue, teeth, lips) burst in consonants. They are concentrated more or less on their exit from the phonetic apparatus, by means of the speaking trumpet, modifiable according as the lips and the cheeks forming them are projected in front, outwards or inwards, etc.

The singing voice is thus produced with its *timbre*, articulation and compass.

Although theoretically we established two systems of resonators (and it may be useful to recall this arrangement to explain the different vocal methods with which we shall occupy ourselves later) it is no less true that we recognise it to be impossible to isolate any one of these resonating cavities and to make exclusive use of one of them to amplify the initial note produced at the level of the glottic reed. It is true that one knows, when a sound is uttered, that it is more or less intensified by this or that sounding board, but it is no less a fact that everything around the initial sound vibrates, as much the singer himself as everyone and every object round him. This is a physical law so well known that it need not be recalled here.

The synthetic description of the vocal apparatus which we have given only provides us with a general idea of the adaptation of its different constituent parts, an adaptation which varies, moreover, for the singer at certain points of his keyboard.

In reality, owing to the variable relations which the bellows and reed can take, and owing also to the predominant use of this or that resonating

cavity, the singer can run over his whole vocal scale. It serves him, so to speak, for special purposes, varying and allowing of peculiar physical and physiological arrangements according to the group of notes of adjacent tonality that he has to utter. His diatonic scale is composed of two extremities and a middle portion ; the process by which he climbs the lower part cannot assist him to mount the higher scale, as it is not the same in both cases. The one, applied to the emission of deep notes, has received the name of *chest register*<sup>1</sup> ; the other, employed for high notes, is called *head register*. We may say, from this moment, that in the middle part of the voice the singer can use, within the limit which we shall lay down later, one or other of these methods indifferently, and even of a sort of combination of both, which has received the name of *mixed voice*, or *middle register*. We shall successively study these different clinical modalities of the singing voice.

#### B. SPECIAL MECHANISMS. REGISTERS

Until the discovery of the laryngoscope—that is to say, until the year 1858, and up to the time of

<sup>1</sup> Instead of the term *chest register*, we shall employ indifferently the words *thick register* (so called by Curwen), or *deep, deep or lower mechanism, chest voice*. Similarly for the *head register*, which we shall call *thin* (Curwen), or *upper mechanism, or head voice*.

the works of its inventor Garcia<sup>1</sup>—we were almost completely ignorant of the conditions of these various mechanisms. Turck and Czermak, in fact, occupied themselves rather with pathological alterations of the vocal mucous membrane than with physiological conditions of song, which, on the contrary, keenly interested the promoter of the laryngeal mirror, the centenarian of yesterday, scarcely a few months dead, Manuel Garcia.

Earlier observers had well recognised the difference between the head and falsetto voice and that of the chest, owing to the observation of the vibrations in the face and cranium or in the thorax, vibrations which it was easy to demonstrate by applying the hand to one or other of these resonant cavities.

On the one hand, experienced singers noticed that the emission of certain middle notes was most painful and most laborious when uttered in the chest voice, therefore they used almost automatically and to themselves the more possible head voice, but they had no scientific datum to direct its judicious use and above all to unite between them these different registers, so as not to make what professionals call “a hole in the voice,” at the

<sup>1</sup> MANUEL GARCIA, *Observations physiologiques sur la voix humaine* (Paris, 1861).

moment of the substitution of the chest register for that of the head.

On the other hand, physiologists were reduced to experiment, being unable to observe the larynx directly during the emission of the singing voice. It is thus that the most diverse theories were advanced. Comparisons with sonorous instruments<sup>1</sup> were the foundation of all kinds of hypotheses.

The introduction of the laryngoscopic mirror into vocal practice allowed the glottic orifice and the vocal cords to be seen in function, and from this time numerous and important works on the physiological side of the question sprung up in every direction. We may quote among the

<sup>1</sup> GALEN compares the vocal organ to a flute (*De usu partium*, Venetian ed., published in 1576).

FABRICIUS, to the pipes of a mouth organ (Leipzig ed., 1687).

DODART, to a clattering window-frame (*Causes de la voix de l'homme et de ses divers tons*, 1700).

FERREIN, to the spinet (*Formation de la voix de l'homme*, 1741).

MAGENDIE, to a reed instrument (*Éléments de physiologie*, 1816).

SAVART, to a birdeatcher's decoy (*Ann. de chimie et de physique*, 1825).

MULLER, to a special reed instrument (*Manuel de physiol.*, 1851?).

LEHFELDT had foreseen the head and chest mechanism when he said that in the first the edge of the cords vibrated alone, and in the second their whole length (*De vocis formatione*, 1835).

principal those of Bataille,<sup>1</sup> Fournié,<sup>2</sup> Mandl,<sup>3</sup> Lermoyez,<sup>4</sup> Lennox Browne and Behnke,<sup>5</sup> Castex,<sup>6</sup>

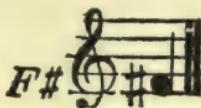


FIG. 1.



FIG. 2.

Position of the vocal cords during the emission of the middle register, lower notes (fig. 1) and upper (fig. 2). (From photographs by French.)

Vacher,<sup>7</sup> Mackenzie,<sup>8</sup> Curwen and Garnault,<sup>9</sup> to

<sup>1</sup> BATAILLE, *Nouvelles recherches sur la phonation* (1861).

<sup>2</sup> FOURNIÉ, *Physiologie de la voix et de la parole* (1886).

<sup>3</sup> MANDL, *Hygiène de la voix parlée et chantée* (1876).

<sup>4</sup> LERMOYEZ and GOUGUENHEIM, *Physiologie de la voix et du chant* (1885). LERMOYEZ, *Étude expérimentale sur la phonation* (1886).

<sup>5</sup> LENNOX BROWNE and BEHNKE, *Voice, song, and speech* (French ed., trans. by Garnault, Paris, 1899, Soc. d'édit. scient.).

<sup>6</sup> CASTEX, *Hygiène de la voix chantée et parlée* (Masson, 1894).

<sup>7</sup> VACHER, *Thèse de Paris* (Masson, 1877).

<sup>8</sup> MORELL MACKENZIE, *Hygiene of the organs of voice* (French ed., trans. by Brachet and Coupart. Paris : Dentu, 1888).

<sup>9</sup> GARNAUPT, *Physiologie, hygiène et thérapeutique de la voix parlée et chantée* (Paris : Maloine, 1896).

mention only the works of physicians occupied with the question, for a goodly number of other memoirs and tracts have been published equally by professors of singing (*vide* Historical Sketch).

Thanks to these various studies, one may say to-day that there is agreement as to the special arrangements which comprise the chest register and that of the head.

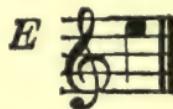


FIG. 3.



FIG. 4.

Passage of the voice in the upper register before (fig. 3) and after (fig. 4). The difference is very clear. (*From photographs by French.*)

1. *Chest register.*—It is admitted that in the mechanism called *chest*, the cords vibrate throughout their length and thickness, which has been designated by several authors, Curwen, Browne and Garnault, under the name of *thick register*.

It is admitted also that the vibrations of the glottis are especially reinforced, in this case, by the lower sounding-board (thorax, lungs, trachea), and that in proportion as the tonality is raised, the cords are more contracted, closing more and more and progressively the glottic orifice, to reach gradually the moment at which the second register intervenes. With this second register we shall now occupy ourselves ; to it has been given the name of *falsetto voice* or *head register*.

2. *Head register. Falsetto voice.* — In this mechanism it is considered that the vocal cords vibrate only by their internal border and their mucous bed, that consequently the vibrating surface of the cord is very short, the glottis resting partly open in its middle position, the tensor muscles being partially relaxed. Briefly, according to the expression of Castex, the vocal reed is in a state of relaxation—that is to say, it is in relative rest. Consequently, the emission of this special voice demands on the part of the singer much less effort than for the production of the so-called chest voice.

Finally there are the upper resonators which, especially, supplement the voice.

The so-called *falsetto voice* is simply a mixture of these exaggerated arrangements ; it admits

consequently of the minimum of vibrating surface and volume of air at disposal, but it does not merit being placed in a special register.

The photographs of French (of Brooklyn) show in a very clear, and one may say peremptory,

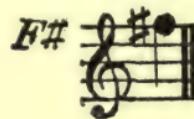
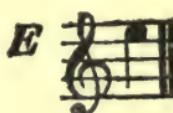


FIG. 5.



FIG. 6.

Appearance of the larynx at the moment of the passage of the voice from the middle register (fig. 5) to the upper register (fig. 6). (*From photographs by French.*)

fashion, the modifications of position of the vocal organ at the moment when the head register succeeds that of the chest (figs. 1, 2, 3, 4, 5, 6, 7, 8).

**3. Transition, mixed voice, middle.**—As we said at the beginning of this section, a singer starts from the bottom of his vocal scale in the

chest register, so that from uttering the deep notes, he changes this mechanism, at a certain point of his vocal key-board, to reach in the scale notes of higher tonality. The moment when this substitution comes into play is called *transition of*



FIG. 7.



FIG. 8.

Larynx seen during the emission of the *ut* sharp (fig. 7) and of the *fa* sharp (*contre-fa*) (fig. 8). (*From photographs by French.*)

*the voice.* This transition may be made in an automatic way, that is to say, unconsciously, or, on the contrary, it may be voluntary, according to a method determined by education.

In the first case, the transition depends on a real physiological necessity; it is produced when the reed and the bellows have given their

maximum, the one of muscular tension, the other of expiratory pressure. At this moment the expanding forces, in length and thickness, of the cords become in equilibrium and are annihilated, as Fournié has shown, and then the head register comes in to raise the height of the tone, bringing about a general stop and the predominance of the upper resonators. According to the vocal powers of the subject, this transition can be more or less retarded and produced in a variable part of his vocal scale. Faure<sup>1</sup> estimates that in letting nature act, the transition is made in men and women exactly on the same note, from *mi* to *fa*, from *fa* to *fa* sharp, or from *fa* sharp to *sol*, at the difference of an octave.

In the second case, voluntary transition, education can expedite this transition and even regulate the moment at which it occurs. We shall see later how important it is for a singer to observe in a methodical, and one may say systematic, manner the transition of his voice from one register to the other in the conditions determined according to the requirements of each case and each register.

Always a process—one may say a trick—exists which allows a singer to retard slightly the intervention of the head register and to prolong that of the chest; this is the voice called *mixed*, which

<sup>1</sup> FAURE, *La voix et le chant* (Paris : Heugel, 1886).

allows a partial stop of the thyro-arytenoid muscle (in its horizontal fasciculus, according to Fournié), a partly open glottis and the PROGRESSIVE substitution of the upper resonators for the lower sounding-board, which continues to vibrate in spite of all. The whole group of notes of following tonalities which can be given indistinctly in the thick register extended to its furthest limits, or in mixed voice, has received the name of *middle*.

This process has been much debated. For some, Fournié in particular, it constitutes a special register. This is the *palate voice* of Crosti,<sup>1</sup> so-called because according to him it gets its resonance from the palatine arch; *sinking*, for others, because the upper resonating cavities are altered in form and muffle the sound by making it pass by a narrowing of the buccal orifice to resound in a sonorous pipe, widened by the enlargement of the mouth and elongated by the lowering of the larynx.

For some (Moura-Bourouillon),<sup>2</sup> it is only a *diminished chest voice*, taking support from the sounding-board of the head.

For Garnault, on the contrary, it must not be made the upper part of the chest register, since it

<sup>1</sup> CROSTI, *Gradus du chanteur* (1893).

<sup>2</sup> MOURA, *Voix et registres* (Congrès de laryngologie de Paris, 1889).

is produced with a glottis arranged as in the lower part of the thin mechanism.

For Lemaire and Lavoix,<sup>1</sup> it is one composed of two registers (head and chest), for it can make itself felt on this side or that of their coincident notes.

We shall be content with the knowledge that it amalgamates them both by the timbre in using the two sounding-boards, for it diminishes little by little the thoracic resonance to substitute for it progressively that of the head. For these various reasons we shall consider it as a mechanism of transition, and we shall call it *mixed* or *middle register*, mixed in order to understand its physical intermediary arrangements, middle to designate that part of the range of voice at which it occurs. We shall see in the course of this work the importance of this quite special sonority of the singing voice. Let us say from this moment, that it would, perhaps, be fatal to certain singers if it happened that they passed abruptly from the chest register to that of the head without the graduated transition which the well-conducted mixed voice does for them. On the other hand, the use of this special mechanism rests the singer; it allows him to utter sounds pleasant and less fatiguing for the ear of him who listens, for the hearing of the chest voice forced to its

<sup>1</sup> LEMAIRE and LAVOIX, *Le Chant* (Paris, 1881).

extreme limits fatigues the hearer as much as the singer. Finally, the methodical and intelligently graduated use of the mixed voice adds to the variety and often to the elegance of the vocal scale of him who knows how to make appropriate use of it.

## CHAPTER III

### ON VOCAL ABUSE

**DEFINITION.**—By the expression *vocal abuse*, is to be understood the imposition of a bad management on the phonating organ by demanding of it an irregular exercise of function which exaggerates, impedes, alters or diverts its normal physiology.<sup>1</sup>

### PHYSICAL CAUSES

After we have reviewed the different clinical forms of the singing (and, we may also say, of the speaking) voice, we shall study under this title all the influences and all the causes which make a defective instrument of the phonetic apparatus, either because it is malformed or altered, or because it is disproportioned in its constituent parts, or wants the organic aptitude required for the production of the yield demanded of it. We shall see, further, in the chapter which will form, as it were,

<sup>1</sup> This term *vocal abuse* was first employed by Castex in a communication bearing this title, and made to the Société française d'oto-rhino-laryngologie in 1894.

the appendix to this report, that orators and, generally, professors of the speaking voice are subject to nearly the same causes of fatigue as singers.

#### MALFORMED OR ALTERED APPARATUS

Every temporary or positive ailment likely to attack the different parts of the vocal organism will merit quotation in this section, from the rachitic deformities of the thoracic cage which hinder the play of the bellows, from the simple cold, often so disastrous when the artist neglects it and continues to sing, to emphysema and all the chronic affections, early and latent tuberculosis, etc. . . . ; but it would be fastidious and inopportune to enumerate them in a work of this kind. The subject has, moreover, been completely developed in the recent work of Perretières,<sup>1</sup> and we must limit ourselves to referring to him those of our readers who wish to have more precise knowledge on this part of the question. We will be content to emphasize the changes attacking the upper resonance chambers or altering the quality of the timbre (see on this subject the works of Trasher,<sup>2</sup> Castex,<sup>3</sup> and

<sup>1</sup> PERRETIÈRES, *Traité des maladies de la voix chantée* (Lyon, 1907).

<sup>2</sup> TRASHER, *The Lancet Clinic* (8th Oct. 1897).

<sup>3</sup> CASTEX, *La valeur des maladies des cavités résonantes pour le chanteur et leur traitement* (Congrès de Lisbonne, 1904).

Joal<sup>1)</sup>. These are primarily nasal obstructions (deflections of the septum, spurs, posterior ends of turbinals, hypertrophy of the latter, or, still more, adenoids), which make the sound nasal and cause difficulty in the breathing function by obstructing the passage of air through the nose.

It is necessary to add to these different morbid conditions the want of development of the maxillary sinuses by infantile adenoidism, or their more or less transient inflammation (chronic sinusites), which suppress thereby the resonating power.

Hypertrophy of the tonsils muffles the voice by partially fixing the soft palate ; narrowing of the pharynx involves a guttural utterance ; insufficiency of the palatine vault and soft palate, specially described by our confrères Lermoyez<sup>2</sup> and Castex,<sup>3</sup> occasions a nasal tone ; badly arranged or incomplete teeth impede the articulation of certain consonants, modifying the speaking trumpet ; a malformed palatine arch or distorted lips may obstruct pronunciation and diminish the vocal outlet.

There remains, finally, in this rapid enumeration of the causes susceptible of altering the vocal instrument, to speak of injurious influences due to bad hygiene. Fournié indicates the principal ones :

<sup>1</sup> JOAL, *Revue de laryngologie*, May 1890.

<sup>2</sup> LERMOYEZ, *Annales des maladies de l'oreille et du larynx*, 1892.

<sup>3</sup> CASTEX, *ibidem*, 1893.

the abuse of tobacco, of alcohol, the absorption of dust capable of irritating or congesting the larynx, finally and especially the wearing of a too tight corset which, in some cases, considerably lessens the pulmonary capacity and hinders the breathing. Let us hasten to observe that, in some singers, the wearing of the corset has, if we may say so, no injurious influence ; we will even add (Moure) that this instrument, said to be one of torture, may be useful in certain cases merely by diminishing the reservoir of air too voluminous for a vocal cord of weak resistance.

#### ANATOMICAL DISPROPORTIONS AND WANT OF HARMONY OF THE ORGANS OF THE PHONETIC APPARATUS

We shall study in this section the influence of another series of anatomical malformations, a knowledge of which is very important and to which no author has called attention. These malformations, or, rather, these natural wants of harmony, are nevertheless of extreme frequence and often the source of an almost fatal vocal abuse, if their existence is ignored. They consist in the want of physical agreement or of harmony between the different parts which form the phonetic apparatus. They are a danger for the speaking as

well as for the singing voice, and one of us (Moure) has very often seen, in the course of his practice, commencing singers stopped abruptly, on this account, in their period of vocal instruction.

We may consider two different hypotheses :

In one the cord is tenuous, small and short, like that in subjects singing in the upper register (soprano or light tenor, for example) and the bellows are by contrast largely developed. In this case the subject has unhappily too great facility for increasing the volume of his voice by submitting from the outset of his studies his cords to excessive and exaggerated blasts of air. This fault, a natural one, so to speak, is the consequence of his too great pulmonary capacity. It is rare then, as we shall show presently, for these subjects to sing with the register adapted to their cords. Soprani, high according to their larynx, work as strong female voices, light tenors consider themselves as strong tenors, opera-comique baritones as opera baritones, etc. This is, as is easily understood, a mismanagement, absolutely deceptive, which rapidly carries the singer, if he is not prudent and does not know how to restrain himself, to voice failure.

This final disaster is often hastened by the professor, who incites his pupil to give, at the beginning of his studies, his maximum voice, and

to stake his all before having even begun. The result of this troublesome formation is not long delayed : the signs of vocal overuse and abuse will soon appear, which rapidly increase until the day when the singer, knocked up and played out, finds himself forced to leave the profession. It is, therefore, indispensable, when an organic disproportion, so dangerous for the future of the voice, has been recognised, to hasten to warn both master and pupil of it, in order that both may take the requisite precautions to avoid the abuse of an organ viable (able to live), but requiring some management.

In this instance the functional adaptation of the respiration to the vocal cord, the exact accommodation of the pulmonary tension to the needs of the larynx, should be the continual object of attention of pupil and master. It is a difficult and delicate education to carry out, but possible to realise ; upon it, moreover, depends the whole vocal future of the pupils, who, unhappily, have only too great a tendency to wish to make great use of the apparently vigorous and solid instrument of which they believe themselves possessed.

In a second hypothesis, we find a bellows of feeble vital capacity with strong, resistant cords, well made to emit the strong notes of basso-profundus, of Grand Opera baritones, robust tenors,

contraltos, or even of sopranos. The danger is less grave, because the effects are less immediate; in reality, the subjects, unlike the preceding ones, sing well in a register adapted to their cords and to their resonating cavities. But, in using too largely the chest register, they create in the long run an abuse of the bellows by a too frequent refilling which tries to compensate for the insufficient pulmonary capacity. Whence, after a certain time the appearance of emphysema, fatal ending of a respiration overworked without sufficient impulse.

The remedy, in these cases, is easy to obtain, because it is generally possible to develop the breathing apparatus by methodical and regular exercises, and, consequently, to furnish the vibrating cord, to which we have alluded above, with the volume of air which will be necessary to it to make it give the sonorous yield of which it is capable.

WANT OF ORGANIC APTITUDE OF THE VOCAL  
INSTRUMENT TO THE YIELD DEMANDED.  
DANGERS OF AN EMPIRICAL CLASSIFICATION

Everyone knows that, for the exigencies of musical writing, singing voices have been classed in a certain number of groups, of which the principal are: for men, basses, baritones and tenors, types among which have been placed besides deep

baritones (*bassi cantanti*), high baritones (Verdi type), light baritones (for *Opéra comique*), light tenors, etc.; in female voices, to the types contralti, mezzos and soprani, have been intercalated mezzo-contralti, mezzo-soprani and light sopranos (*coloratur* singers), dramatic soprani and strong female voices (Falcon type), etc.

But for a singer normally and without danger to realise the special qualities of timbre, volume and extent of the category of voice assigned to him, tenor, soprano, or other, it is necessary for his phonetic apparatus to possess a physical organisation appropriate to the yield determined. One ought not, for example, to ask a vocal instrument naturally constructed to emit deep sounds to produce high notes.<sup>1</sup> "A baritone can no more be transformed into a tenor," writes Morell Mackenzie, "than a blackbird into a grasshopper."

This exact adaptation of the function to the organ is therefore a physiological contingency, which should be the basis of all classification.

"The most able professor," further writes the English author, "can be deceived in the appreciation of the vocal powers of his pupil, but nature is

<sup>1</sup> The human instrument, in contrast to those which we construct, is not by functional impossibility prevented from producing these different yields; it is possible at a pinch and provisionally, thanks to its various resonators modified at will. It is just in this that the danger lies.

never wrong ; she revenges herself pitilessly each time that her laws are transgressed."

In these conditions it is a question of knowing if we can appreciate the anatomical and physical dispositions required by such and such variety of voice, and if we have, so to speak, an anthropometric formula which allows us to recruit singers on really scientific and rational foundations. This is a great question which it is of importance to solve, for from the solution springs quite naturally the intervention of the specialist in voice classification. The problem before us is : Can we possibly, by the medical examination of a subject who intends to study singing, recognise and assign to him the class of voice in which he should be trained ? Opinions on this matter vary, and merit, by the authority which attaches to the names of the several authors, to be separately reproduced.

Morell Mackenzie<sup>1</sup> writes : "It is not always easy to recognise the class to which a given voice belongs, especially when its physiological development is not complete. The laryngoscope is useless ; there are no certain signs which allow a contralto to be distinguished from a soprano, or a tenor from a bass."

Castex<sup>2</sup> thinks "That one exposes oneself to

<sup>1</sup> MACKENZIE, *Hygiene of the Organs of Voice*, 1886.

<sup>2</sup> CASTEX, *Hygiène de la voix parlée et chantée*.

inevitable mistakes if one seeks to foretell the kind of voice after inspection of the larynx. It is necessary to be guarded, especially from substituting this visual examination for the experience of a professor of singing and pretending to classify a voice, to make it work as a tenor or baritone, by basing oneself on laryngoscopic examination. Loss of the voice might even result from it. Specialists ought to resist this entreaty, which is often made to them."

Lennox Browne (*Voice, Song and Speech*, 1883), translated by Garnault, less absolute in his way of looking at it, thus expresses himself: "The differences between the vocal ligaments of soprano and contralto, on the one hand, and between those of tenor and bass on the other, are not always well-marked. It is true that as a general rule the vocal ligaments of soprano or tenor are shorter than those of contralto and bass, but it is absolutely true that sometimes one also sees the opposite."

Finally, Maudl (*Hygiène de la voix parlée ou chantée*) writes: "It is impossible to classify voices in an exact manner solely by laryngoscopic examination. The relative differences of length and breadth of the vocal lips are so much the more difficult to determine exactly because one possesses no precise means of mensuration, since the inclined

plane of the vocal lips is variable, there is consequently a parallax, as the dimensions of the body probably exercise an influence so far unknown, etc., all most important general circumstances when it comes to a matter of differences of several millimetres."

In contrast to these opinions, Fauvel (*Traité des maladies du larynx*, 1876) writes : "The dimensions of the glottis vary according to age, sex and individual. The variation affects especially the difference of the length of the inferior cords, and after examination of these cords a doctor will recognize easily a tenor, a baritone, or a bass," and, putting his ideas into practice, he brought, according to the assertions of all his pupils, a jealous care to the diagnosis by means of the mirror of the type of voice of the singer without putting to him the least question.

In their *Physiologie de la voix et du chant* (1886), Gouguenheim and Lermoyez tell us that they have reached positive results which allow them to proclaim that "the previous examination of the larynx offers an undeniable security to the *débutant* who has been launched upon a path that is perhaps not his."

To form an opinion in this conflict of ideas, it will suffice to compare the physical and physiological conditions demanded by the mechanisms of pro-

duction of the voice with the information which the routine practice of the laryngoscope gives us in normal singers endowed with healthy voices, which education has not yet spoiled. We have always seen in these subjects—model types in some ways, unhappily somewhat rare in nature—a perfect adaptation of their phonative organ to the natural laws which regulate this function.

In singers of low range (bass, deep baritone—called bassi cantanti) demanding especially the use of the chest register, which gives power and volume to the voice, we find a reed, a bellows, and a lower sounding-board of large proportions accommodated to this yield, proportions which are often revealed in their physical aspect, *i.e.* in the outward frame. These are generally big subjects of great corpulence, with a neck raised and made prominent by a projecting Adam's apple, which betrays the length of their cords (Poyet). They have an ample chest, of great capacity. In them the laryngoscope reveals constant signs. Their larynx is enlarged in its different diameters, their vocal ribbons are long, large and thick, peculiarities especially marked in basses.

In singers (soprani and light tenors, to take the opposite extremes) whose high range of voice demands above all and almost exclusively the use of the head mechanism, we meet an opposite and

different uniformity of character. Their acute tonalities are produced by the vibrations of a thin, small cord, requiring less breath, with the support of the upper resonators. And, in the same way, these subjects show a quite different architecture, smaller in height, with a thick short neck, the resonating cavities of the head and face developed, the nasal fossæ large, and with a large mouth and pharynx. To the mirror, their larynx always offers much more restricted proportions, the vocal cords are less extended in length and thin. These peculiarities are the more marked when the voice has a higher range. They are different in the true strong tenor whose volume of voice requires a strong bellows, and, from this fact, a more resistant reed with thicker cords, a more thickset larynx and a larger general sounding-board.

Let us add to these data the assistance which can be obtained from spirometry by measuring exactly the pulmonary capacity, thoracic mensuration, and the radioscopy of the face which fixes for us the dimensions of the resonating sinuses.

We are, therefore, able to appreciate the vocal powers of a singer, but within limits which allow of being demarcated and which appear to reconcile the different opinions which have been quoted. We cannot, evidently, from our examination, state precisely the graduations of the range of voice and

diagnose at sight a deep baritone from a high one, a mezzo from a dramatic soprano sometimes destined to become, by regular and well-executed work, a strong female singer ; but it is quite possible to say to a subject : " You are formed for a deep voice of great volume (baritone, bass, or contralto) ; your cords have the requisite length, the solidity, the robustness necessary for resisting a strong bellows ; you can, therefore, use the chest register, you have its powers, but under well-determined conditions, by knowing how to make use of the various tricks which make the art of the singer."

As we shall see later, and the fact is easy to demonstrate, *the strongest voices cannot endure the regular, systematic and continued use of the so-called chest register.*

On the contrary, if we recognise in the subject a thin, fragile, short cord, we class it in a high range of voice (soprano, light tenor), and we recommend him to make the least possible use, and in a quite exceptional manner, of the chest register.

We may be at variance with the professor. Certain subjects, who appear to us, for example, fit for tenors or sopranis, will be judged by him as baritones or contralti, or strong female singers. He hears them with their timbre and we see them with their cords. It is, then, a question of those physical disharmonies which we have previously

studied,<sup>1</sup> in which the bellows has too great proportions and incites them to force their voice and to force it continually when their fragile reed is built for the thin (head) register. This artificial range of voice is only provisional, for sooner or later the cords weaken. In such cases, it is not merely the vocal diagnosis, it is the prognosis also, which we establish.

It is important, therefore, from the commencement of study, to classify, so to speak, the aptitude and physical capacity of the singer and to see for what results they destine him. It is a true council of revision, to use the word of Poyet,<sup>2</sup> which is imposed and to which the specialist should go. He alone can predict the errors and dangers inherent in an empirical classification such as is readily made and which more often conjecture for singers powers which they do not possess. Then comes the fatal, inevitable failure of the voice at a more or less near date, and the several examples of singers still celebrated who resisted like misfortune do not in the least invalidate this rule; they were either exceptionally formed or they changed their method before the harm was irreparable.<sup>3</sup>

<sup>1</sup> *Anatomical Disproportions and Want of Harmony of the Organs of the Phonetic Apparatus*, p. 35.

<sup>2</sup> Article written in the review *Musica*.

<sup>3</sup> As examples of celebrated "unclassified" artists may be quoted: The contralti Grunaldi and Pisaroni, who had

How many debutants have foundered and gone down again for ever, and remain done for by an error of classification ! Several years ago, one of us (Moure) gave one of his pupils the idea for a thesis read before the Faculty at Bordeaux on the classification of voices, and in this work M. Cunaud concluded : "The classification of voices is only necessary for musicians for the good administration of harmonized music and for choirs."

There, in reality, lies the truth. This is the means for avoiding the serious danger which we have indicated, in such a way that the examination of the larynx is dispensable, according to us, at the commencement of and during the study of singing. The laryngologist with a little experience at this kind of work will be able to say: great or small larynx ; strong or delicate organ;—or indeed : vocal apparatus intermediate, breathing weak or studied as soprani ;—the tenor Elleviou, who had appeared at the Comédie Italienne with a bass voice of small extent ; —the bass Galli, who had played the tenor's parts ;—the tenors Chollet and Mario, who had first studied as baritones. —The tenors Mierzinski and Nicolini had been considered, one as a bass, the other as a baritone by their professors.—Jenny Lind followed at first, at Stockholm, the lessons of Beig and of Crelius, and appeared in 1837 as a high soprano. Four years later she came to Paris, having her voice already much fatigued. Garcia recognised that the organ had been over-done in its high notes and brought it to its natural limits. Four years later the celebrated singer, completely re-established, made a triumph at Berlin in *Norma*.

powerful. Resonators well or little developed And, on such grounds, the professor could conduct his pupils with security, especially if later examinations indicate that the vocal apparatus is healthy and does not show, after the work, any of the troubles which we shall describe later, indicating abuse. For, from the commencement, it is easy for an experienced laryngologist to cry out to the singer and to the professor : " Breakneck ! you are going wrong."

It is the non-observance of these rules, it is sometimes—we must say it—from the ignorance of the specialist on this subject that come the gropings and the small confidence that professors, artists, and pupils have in the clinical examination that we practise on voice professionals, in general (orators, male and female teachers, advocates, etc.).

## CHAPTER IV

### FUNCTIONAL CAUSES

#### I. SIMILAR PRODUCE, SIMILAR COMPASS DEMANDED OF EVERY VOICE CLASSIFIED IN THE SAME CATEGORY

VOCAL classification, backward though it be, to which the study of singing should tend, allots by convention and musical traditions, to each variety of singers (tenors, soprani, baritones, contralti), the utterance of a settled number of notes of different but connected tonalities, on which composers base themselves for the writing of parts.

To ensure this compass, made requisite by the wants of the repertoire, the professor, *instead of developing the natural powers of his pupil*, is engrossed at first by framing his voice as exactly as possible between the two extreme limits which the classification imposes on him. Every danger lurks in the difficulty, not to say the impossibility, which is attached to this production so uniform. The compass is really nothing, it is only an average containing naturally a certain number of

notes susceptible of increasing by regular work, methodical and sufficiently prolonged; on the other hand, the range of voice<sup>1</sup> is everything. It is that with which it is necessary to cope, as Faure recommended; that is to say, that it is necessary to take for the basis of study the number of notes of connected and close tonality which the singer can utter with most ease and which comprises the best sonorous qualities of timbre and volume—in a word, a complete homogeneity. It interprets exactly that which can give the natural produce of the vocal organism; and to try to deform or modify it is to violate nature. But as the vocal powers differ essentially, it is from this fact the more variable and cannot exactly agree with the whole artificial compass of the classification, for we may say, with Faure, that if there is an art which fails especially to reckon with individualities, it is the art of singing. But several alternatives may be met with:

<sup>1</sup> "The range of voice comprises the group of notes of different tonalities, but close to one another, uttered with the most ease" (MONTAGNÉ, in the thesis *Malmenage Vocal*, Bordeaux, 1906).

"The range of voice is exactly, in the series of notes which the voice can form, the whole of those which are found naturally strengthened and in full sonority without effort by the simple play of the capacities of our vocal cavities and of the tension appropriate to their living walls" (BONNIER, *La voix et sa culture physiologique*, Paris, Alcan, 1907, p. 138).

1. *The range of voice comprises the key-board assigned by convention or even exceeds it in its two extremities.*—In the first case, there are the robust voices, ready made, so to speak ; in the second, the exceptional voices which are always met with and can still exist.

La Bastardelle gave the *ut*<sup>6</sup> and descended to *sol*<sup>2</sup> ; the younger of the sisters Sessi went from *ut*<sup>2</sup> to *fa*<sup>5</sup> ; Mara, from *sol*<sup>2</sup> to *mi*<sup>5</sup> ; Catalani, from *la*<sup>2</sup> to *sol*<sup>5</sup> ; Capi, from *sol*<sup>2</sup> to *fa*<sup>5</sup> ; Malibran and Alboni, from *fa*<sup>2</sup> to *ut*<sup>5</sup>, and Madame Bauwer and Sabine Hitzelbergen filled three octaves.

Among the men, we may quote : Merly, who interpreted without impediment and without difficult rests successively Marcel (high bass) in *Les Huguenots*, Lusignan in *La Reine de Chypre* (basso cantando), and Licinius in *La Vestale* (tenor) ; Tamberlick and Gayarré threw the *ré*<sub>4</sub>, Levasseur and Belval went down to *mi*<sub>1</sub> ; Santini and Porto to *re*<sub>1</sub>.

In singers so exceptionally gifted, the professor had only to develop and perfect the natural powers, which are unhappily rare and which have made of these artists marvellous specimens, whose names will go down to posterity. The following case is unhappily more frequent :—

2. *The range of voice does not cover the compass which the classification assigns to it, or clears it*

*in one of its extremities.*—The first hypothesis is frequently found realized in high basses, whose voices, according to Faure, are rarely complete. “When the sonority of their medium notes is *en rapport* with that of their deepest notes, they pass with difficulty the *ut* or the *ré*.”

We all know examples of singers having the timbre of the strong tenor when they cannot go without effort beyond *fa* or *sol* in the so-called chest voice.

Enthusiasm can well acquire, with time and gradually by work, two upper notes and perhaps one lower note, but to want to ask more in order to respond to the requirements of classification is to demand a work of stretching and of effort. It is very difficult, as Faure writes, to recover safe and sound from these attempts at climbing; the work of stretching to which the voice is incessantly submitted forces the vocal cords to an exaggerated tension, and when the imprudent artist or the pupil wishes to go back, he finds himself taken with a disequilibrated medium; then comes the frightful trembling of the voice, the hawking and all the vocal alterations which are the inevitable consequences of the overworking or, rather, of the vocal abuse. (We shall return later to this important part of our Report; see chapter on the *Effects of Abuse*.)

In the second hypothesis we have to consider a complete vocal displacement, which happens when one meets baritones, for example, who carry back towards the high what they lack in the deep, or reciprocally, and who thus come to enter into the key assigned to tenors or to basses. High baritones are thus limited tenors (Faure). Some even, Martin for instance, can use the two registers equally well, chest and head, reaching higher in the diatonic scale. "A tenor," he adds, "in suppressing the deep notes of a Martin, may be able to sing with impunity in a chest voice what the creator of the style sang more often in a head voice."

Deep baritones similarly encroach on basses.

Thus it is that this acuteness of certain ranges of voice in the domain of another class of singers often makes classification difficult, whatever may be the subdivisions that one has been able to make (bassi cantanti, for example, for deep baritones). And when the compass assigned for the classification is the same, or nearly the same, for certain varieties, these difficulties are only greater. That, for example, which is assigned to the high soprano (light female singer excepted) and to the dramatic soprano is almost the same. "The difference which exists between these two voices consists in the facility which the high soprano possesses for pronouncing the extreme notes and for being able

to attack them without effort (Faure)." Her range of voice is thus found in the highest part of the key-board, but it is a simple question of timbre. Similarly for the mezzo, "who can sometimes approach to the dramatic soprano, sometimes to the contralto," says Faure ; and further on this same author adds : " Among tenors there are sometimes simple graduations which serve for separation : operatic tenors and opéra-comique tenors closely approach one another. It is so easy to confound them that the directors of these two theatres often dispute among themselves, up to the meeting of the Conservatoire, about the same subject fit to be employed in one or the other."

Classifications are, therefore, essentially artificial ; there are too many shades in the voices and in the vocal powers of singers to be able to demand of one whole category between them the same produce ; it is almost an impossibility, and the attempt is a great danger for the pupil. He must take it such as it is, with his own range of voice, which he must essentially respect. "The professor who would wish to obtain a perfect homogeneity from the voice of Mario and claim the same support for his half-voice as for his chest voice, in admitting that he succeeded, would have undoubtedly deprived a generation of dilettanti of one of the most seductive tenors of his epoch" (Faure).

The artist should, therefore, make judicious choice of the parts adapted to his powers. Nevertheless, if he has talent, he will find easily a composer desirous of writing for him a part adapted to his range of voice.

This is, in brief, the continuation of what we have written in the preceding section. No classification at the beginning of study and making each pupil work alone in the range of voice which is given him by his anatomical configuration, ends by seeing, at the finish of his studies, if he can be placed in one of the artificial categories established by the various composers.

## II. DIFFERENT AND VARIED YIELD OF ONE VOCAL APPARATUS

*(Displacement or Change of Range of Voice)*

Under this title, we consider the dangers resulting : (1) from a variable and provisional displacement of the range of voice; (2) from the definite substitution of a new compass for the natural range of voice.

1. *The variable displacement of the vocal range* is the result of the conventional classification of voices which assigns to them a determined repertoire. Some amateur, for example, classed in a certain category, thinks himself capable of

singing all the pieces in which he does not see represented the extreme notes of the scale which is assigned to him. Some professional will see himself obliged to fill all the parts which come to him by the very nature of his employment. This is a grave mistake, for they have counted without their range of voice, which, very often, save for exceptional powers, does not lend itself to this variation of repertoire.

The theatre, unhappily, does not always take into account those physical conditions which should prohibit a subject from metamorphosing his voice without cessation, from constantly changing its compass. The same baritone often sings Nevers (*Les Huguenots*), William Tell, Don Juan, Mephistopheles (Gounod's *Faust*), as well as Rigoletto, Valentine (*Faust*), or the Count de Luna (*Trovatore*). He is, therefore, at once a deep baritone and a high baritone of the Verdi type.

Some mezzo, without sufficient depth, approaches more to the soprano than to the contralto, not fearing to attack parts for deep ranges of voice, written for quite special voices. Composers, in fact, often adapt their pieces to the exceptional range of an artist of the moment, which, as a general rule, the singers who follow do not possess. The insufficiency of a provincial troupe explains the so dangerous accumulation of parts. In fact,

as Faure has written : "If one excepts the towns of the first order, the strong female singer is often at once soprano, mezzo, and contralto. She sings to-day *La Juive*, to-morrow *Le Prophète*, then, successively, *Les Huguenots*, *La Favorita*, and *Robert le Diable*. She is at the same time Falcon, Stoltz and Viardot. This is the Maître Jaques of the troupe, and one may say that her repertoire is the more rich as the management is less."

There are not only the different parts which displace the voice, for the same musical page of a same score can carry like danger. *La Favorita*, *La Reine de Chypre*, *Le Prophète*, for example, are in this way full of difficulties for the contralto ; the range of voice varies from one act to the other, and often several times in the same piece.

In this way the modern composers, and especially the Wagnerian school, are accused by certain authors of demanding "superhuman" scales from the voice. "These are the executioners of the voice," writes Botey,<sup>1</sup> "for they wrote parts, like those of Tristan and Yseult, which are not singable, unless by wishing absolutely to sacrifice the voice. To-day the symphonic element is imposed more and more, and the noisy, deafening, even stupefying orchestration, playing continuously, reigns like a

<sup>1</sup> BOTHEY, "Maladies de la voix chez les chanteurs" (*Ann. des mal. de l'oreille et du larynx*, 1899).

sovereign in the theatres to the detriment of the vocal organ and of the public."

Without wishing to enter into too technical a discussion, let us be contented by comparing this quotation with the following lines written by Tosi<sup>1</sup> in 1723, and which show us that at all times a musical evolution has taken the proportions of a revolution in the art : "It might well be possible that as the extravagant ideas which one hears to-day in a great number of compositions was the only cause which raises for singers the means of uniting the singing to their understandings, for the fashionable airs go generally at full speed and put the singers into so violent an agitation that they lose breath and find themselves totally deprived of the means of setting off all the delicacies of their intelligence."

That it is sufficient to us to know that the German artist interpreters of Wagner only reach him by natural powers sufficient and specially educated to render this composition, and that they thus retain their voices a long time, witness the example quoted by Perretières,<sup>2</sup> of Vogl and Niemann, who were still in possession of their vocal powers at a very advanced age.

<sup>1</sup> TOSI, *L'art du chant* (already quoted).

<sup>2</sup> PERRETIÈRES, *Traité des maladies de la voix chantée* (Lyon, 1907).

In France, also, a goodly number of singers, having made long and patient studies, and having been most anxious as to the good hygiene of their voices, have actually the wise tendency to specialize themselves, so to speak, by limiting their repertoire to those parts well adapted to their range of voice. Faure, in this regard, has been one of the first to set a good example of sagacity and intelligence which many artists, too presumptuous as to their resources and who do not fear to attack every part, should imitate. "Begged many a time," says Faure, "to sing baritone parts written by Verdi, I have thought fit to resist the temptation to enrich my repertoire by many magnificent parts that I should have been happy to interpret, *but they were written for a range of voice which my vocal powers did not permit me to attack.*"

These are words which merit figuring in big letters in treatises on singing, for this is, it must be said, the principal and most serious cause of vocal abuse.

2. *Definite substitution of a new range of voice for a natural one.*—This is again the consequence of artificial classification. An intermediate range of voice, so to speak, situated at once on both sides of the frontier which conventionally separates two classes of voice, is obliged to be enrolled in one or the other. Take, for example, a subject astride, so to speak, between the baritones and the tenors ; in

virtue of an unhappily obligatory classification, he sees himself constrained to choose unreservedly one or other of these two lines. If his range of voice especially occupies the lower one and the chest register, and if he is by mistake carried away as a tenor, his voice will be submitted to a continued stretching and devoted to *poitrinage*.<sup>1</sup> “ We see uniformly at the theatre certain subjects abruptly change their line. When it is only a question of graduations the thing is possible. An opéra-comique tenor can do at a pinch, after training, the work of an opera tenor, called ‘ transition,’ but when he is endowed with a special head timbre and a light, thin voice adapted to a high tonality, he cannot attack the *grand repertoire* without great danger. The desire of filling this more remunerative line involves him in this false path ; but he will demand of the chest voice a maximum which a bellows and reed badly made for this register often cannot give him. It is equally thus that certain high sopranos seek to become strong female singers, and that with similarly insufficient powers and aptitude. Certain mezzos finally become contraltos with cords and a pulmonary capacity which do not predispose them for the thick register.”

<sup>1</sup> This term *poitrinage* designates the abuse of the chest register pushed to its last possible limits.

## III. DEFECTIVE USE OF THE BREATHING

The causes of abuse inherent in the defective use of the breathing reside in the employment of a similar type (clavicular, costal or diaphragmatic) which may of themselves possess inconveniences, and which a professor imposes confusedly on all his pupils without taking into account their natural individual functional capacities and the produce sought.

In our sketch of the function of the phonetic apparatus, we pointed out that it was possible to submit the play of the thoracic cage to the will, to regulate and to limit the enlargement of the pulmonary reservoir indifferently, according to certain diameters and certain regions. Thus types of respiration relatively partial are established, or rather with the predominance of clavicular, diaphragmatic and costal. Before explaining our way of looking at this subject, we will first pass in review the different opinions of authors who have been occupied with this interesting question. We will state succinctly the names of the partisans of this or that method of respiration and the criticisms of their opponents.

*Clavicular (or superior costal) respiration* requires inspiration by raising the first ribs and clavicle by strongly depressing the abdominal wall.

For most physiologists this is the natural and ordinary respiration in women. In singing, some authors rebuke it as being laborious. Mandl<sup>1</sup> even accuses it of compressing the vessels of the neck, of lowering the tongue, and of altering from this fact the resonance of the voice by lengthening the upper sonorous tube.

Garnault<sup>2</sup> finds it painful because of the weight of the shoulders and arms which the singer must lift at the moment of each inspiration.

Joal,<sup>3</sup> our regretted Secretary General,<sup>4</sup> who has published a very interesting and instructive volume on respiration in singing, has very clearly brought forward the exaggeration, certainly excessive, of these critics. Nevertheless, it is very evident that this type of respiration only allows of the storage of a limited volume of air, as proved by the spirometric experiments of this author.

*Diaphragmatic (or abdominal) respiration* rests entirely in the play of the diaphragm, its complete lowering in inspiration with a large swelling out of the abdomen. Mandl has been its true promoter and ardent defender. "A single muscle," says he, "acts in inspiration, it enlarges

<sup>1</sup> MANDL, *De la fatigue de la voix* (1855).

<sup>2</sup> GARNAUT, *loc. cit.*

<sup>3</sup> JOAL, *De la respiration dans le chant* (Paris : Rueff).

<sup>4</sup> Of the Société française d'oto-rhino-laryngologie.

the vertical diameter of the thorax. The forces expended to put it in motion are nominal, for it is only a question of the displacement of soft and mobile viscera in the abdominal cavity. When, for the requirements of singing, a prolonged aspiration is necessary, the contest between the inspiratory and expiratory muscles is passed on to the same viscera and the thoracic walls experience no fatigue."

When one is perfectly master of diaphragmatic respiration, one can take deep inspirations without in any way raising the ribs, even as Magendie has said. "Professors of singing," writes Béclard in his *Treatise on Physiology* (1870), "generally recommend ventral respiration. This is, in reality, abdominal respiration (that in which the enlargement of the chest is made at the expense of the exaggerated lowering of the diaphragm), which stores up the greatest quantity of air in the chest, which allows of sustaining the longest the utterance of sound, and which defers the interruptions necessitated by the requirements of inspiration."

By contrast, the inconveniences inherent to such a respiration are pointed out and precisely stated by Joal, who accuses it, rightly, of doing without the powerful inspiratory and expiratory force of the thoracic muscles, and of submitting to a strong pressure the organs inclosed in the abdomen, thus causing numerous morbid accidents. "What wasted

work," says Cheval,<sup>1</sup> "to push in all directions the intestinal mass which tends to escape, and by natural and artificial orifices; what herniæ, what affections of the liver and stomach, what disturbances of the abdominal circulation, must not such a manœuvre produce, and what digestions must this trituration bring!"

And, indeed, Wingen,<sup>2</sup> in 1880, reported cases observed by him and by the gynaecologist Barnes, of a whole series of various uterine troubles supervening in female singers using this method of respiration.

We might add that if the singer is not fasting or has not finished his digestion, this respiratory type fatigues him beyond measure, it becomes, further, difficult to carry out because of the uneasiness which the diaphragm experiences in depressing a stomach half full and viscera which are still digesting. It is, moreover, for this reason that it is generally recommended to artists before singing in the evening, to eat at least three hours before going on, and to be sparing at the meal which precedes the performance in which they have to appear. Most singers of experience well know this principle of hygiene, and carry it out for

<sup>1</sup> BONHEUR, *Essai de l'enseignement vocal actuel*, with a medical note by Dr Cheval.

<sup>2</sup> *Boston Medical and Surgical Journal*, 1880.

themselves without the doctor's orders. We speak especially here of the professionals who want to possess, for singing, their whole respiratory capacity.

*Costal (or costo-diaphragmatic) respiration* distributes the muscular work over a greater extent. It is no longer a partial or exclusive respiration. It is the lot of man when he breathes naturally. Joal, who has been a convinced partisan thereof, thus sketches its description and technique :

"In inspiration, the clavicle and first rib should remain immobile. The thoracic cage will be enlarged especially in its middle part and at its base, the point of the sternum being carried upwards and forwards.

"The cavity of the stomach will follow the enlarging movement of the lower ribs.

"The abdominal wall will be lightly depressed at its lower part in the umbilical and hypogastric regions."

This is the type approved by Lennox Browne and Behnke, Garnault, Morell Mackenzie, etc.

If now we consider in a general way the opinion of the authors who are occupied with the manner in which the breath should be taken in singing and with the different respiratory types, we see that they have all had the same object : to educate these different respiratory types of breathing so as to obtain the maximum replenishment with a

so-called minimum of effort. Is there not in this fact a very grave misunderstanding and a most regrettable tactical error? For if it is important for the voice professional (singer or orator) to know how to breathe, it is still more useful for him to know how to expend with method the air which he has stored up. The regulation of the tension, the gradual, progressive and reasonable distribution of this air according to the necessities of each case, is a cardinal point in the art of singing. But no author has turned his attention to this filtering, to this practice difficult to obtain.

Similarly, no one has taken into account the natural functional capacity of the pulmonary organ, which varies according to the subject, and which requires especially, as we shall see, to be taken into consideration.

In the presence of this neglect and even error of physiologists, who create *cap-à-pie* respiratory types essentially artificial, we shall be almost inclined to give right, within a certain limit, to Ponchard,<sup>1</sup> when he writes: "No one has sung more than I. It is true that in my time music was not made so recondite as it is to-day. We sang with the powers which nature had given us without worrying ourselves whether we breathed with the ribs or the diaphragm, and, curiously

<sup>1</sup> In BURG, *De la gymnastique pulmonaire* (Paris, 1875).

enough, despite our profound ignorance of the art of breathing and of many other things, we sang well and long with our poor natural voices, whilst since the *savants* have taken to fatiguing voices, one only hears more spoken of exhausted singers and lost voices."

Ponchard would have been able to add to the *savants*, voice destroyers, as he calls them, the professors themselves who often obtain for doctors patients difficult to treat and often impossible to cure. We have all noticed, however, that if we have the misfortune to have to treat an artist three parts done for, and often prematurely arrived at the end of his career by his own fault (abuse), he does not miss accusing the specialist of having spoiled his cords by dangerous cauterisations.

Be that as it may, we cannot too often repeat that the natural powers of the singer should guide the professor. He should take careful account of it before appropriating, as he more often does, the respiratory type he prefers to all his pupils indiscriminately. The pulmonary capacity differs with the individual. A subject in whom all the constituent parts of the phonetic apparatus are in perfect harmony and who takes by his ordinary respiration, automatically let us say, a quantity of air apparently and approximately sufficient, which is verifiable by the spirometer, does not need to

change his habitual mode of inspiration. A female singer who inspires the requisite amount by the respiratory type proper to her sex, *i.e.* by the costo-superior or clavicular method, ought not to be forced to respire with her diaphragm. Reciprocally a singer who takes in adequate air by the costo-diaphragmatic respiration peculiar to man, cannot logically be forced to respire by the clavicular process. This would be to wish to violate nature to no purpose in one case, with a useless over-driving in the other. "Where nature has done everything," says Faure, "it would be not only useless, but imprudent, to want to add anything." It is in a like situation that we very well understand the reasons which made Fournié say: "The solicitude of the singer should be applied to developing natural respiration"; and Botey<sup>1</sup>: "To respire well in singing is not a question of adopting a respiratory type, but of breathing naturally, of exaggerating normal respiration."

On the other hand, it is necessary to remedy natural incapacities. A subject possessing an inefficient bellows in relation to his reed ought to be educated to take in the most possible air, not merely with a partial respiration, even should this be diaphragmatic, but by the enlargement of all the

<sup>1</sup> BOTHEY, "Des maladies de la voix chantée" (*Ann. laryngol.*, 1899).

diameters of the thoracic cage. Inversely a singer who possesses an exaggerated pulmonary capacity in relation to the limited size of his cords (high soprano, light tenor) will be amenable to the respiratory method in which the diaphragm, for example, will not act as a powerful piston. The corset, unsuited to female singers who need to give a great volume of voice (contralti, strong female voices, etc.), can, on the contrary, be useful, indispensable even, and without prejudicial influence to artistes who have to impart a minimal value of air (light female voices, light sopranis).

It is equally necessary, as we mentioned above, to take into account the needs of the breathing, of its accommodation to the work to be done. One cannot, without consideration and without danger, impose the clavicular type on a bass, a baritone, or a strong tenor, or a contralto, who require a large volume of air.

One cannot, on the other hand, assign to the lower ribs and to the diaphragm of a high soprano or of a light tenor the exclusive respiratory part ; this is, in fact, to lead them to produce excessive blasts of air in expiration and to abuse thereby their thin and fragile reed.

It is, besides, the expiration which should specially be educated and watched, and we think that it is not so much the quantity of air introduced

into the lung which matters, but its judicious distribution.

To seek too great a take in of air is a mistake of method. "An error sufficiently widespread," says Faure, *loc. cit.*, "is that connected and sustained singing depends on the extent of the respiration. One can, however, breathe frequently and sing connectedly and sustainedly. To reach this result, it is indispensable, if one wishes to come to breathe in the middle of a musical phrase, to take exact account of the timbre, of the quality and degree of force given to the note which precedes the respiration, so that the note coming immediately after may have the same timbre, the same quality and the same degree of force, whatever be the interval separating the two notes. In this way the musical phrase, the expression and the declaration will not have to suffer by this voluntary interruption. I think it hardly necessary to say that, under no pretext, ought one to cut a word in two by a respiration."

The dangers of expiration lie in the excess of tension of the column of air expelled, either by the fact of too great a resistance of the reed, which involves in the long run pulmonary emphysema, or by reason of too rough, too active an expulsion of the breath, with all its troublesome consequences for the cords. This is what we shall consider

later in our study of *poitrinage*<sup>1</sup> and of the *coup de glotte*.

#### IV. DEFECTIVE ATTACK OF THE NOTE

To the various causes of abuse that we have explained must be added certain faults of utterance which specially belong to a bad education, to a defective method. To understand thoroughly the mechanism, we must recall that at the moment of attacking a note—that is to say, of producing, by the throwing into action of the reed and the bellows, an initial note of determined intensity and height—the cords may obtain the result sought in two ways: either they contract progressively and only approach each other when respiration begins, or they take the desired degree of tension and adduction at once before the passage of the air.

The first attack is made, according to the established expression, *on the breath*, the second by the *coup de glotte*.

*A. Attack on the breath.*—It is not difficult to understand that the attack of the oten during expiration, or at least when it has begun, must cause more or less considerable loss of the air stored in the lungs; on the other hand, this method of uttering a note must carry a fatal injury

<sup>1</sup> Section dealing with *Defective Use of the Registers*.

to its clearness, and especially to its precision. It is rare that singers thus educated do not too often give their notes more or less below the tone in which they wish to utter it. On the other hand, it does not take long to overwork the breathing by the first leakage of unused air and by this waste, to no purpose, of part of its energy. This is, moreover, an almost obsolete method.

*B. Coup de glotte.*—Quite different is the more universal method called by the name of *coup de glotte*, of which the clinical application (if it is permissible thus to express it) merits careful description as to its technique.

Well executed, it is divisible into two phases, which it is very easy to demonstrate by laryngoscopic examination in singers who have already a sufficient knowledge of their art.

1. At first, the cords are put into vocal position and get ready to vibrate under the influence of the air which is about to try to force their passage. This act is accomplished automatically, unconsciously, just as the finger of the violinist touches the string at the required point to give the note which the bow will produce.

2. In a second phase, almost simultaneously, the air driven from the lungs comes into a state of tension to force the glottic passage, and the note goes out with the desired tonality.

Garcia had long ago, and was one of the first to do so, pointed out the detail of this glottic arrangement to which has been given, improperly in our opinion, the name of *coup de glotte*, since the word *coup* seems to indicate an effort, an injury, when it is really the question of a simple placing in position for singing.

"It is necessary," justly writes Garcia, "to prepare this *coup de glotte* by closing it, whereby the air is stopped and accumulated for this passage; then, as if it effected a rupture by means of a trigger, it is opened by a sharp and vigorous stroke, like the action of the lips energetically pronouncing *p*. This breath also resembles the action of the palatine arch executing the movement necessary for articulating *k*."

C. *Defective coup de glotte*.—Such is, in fact, the true method of acting to attack a note; but if this glottic adaptation is badly carried out, it becomes baneful for the voice. Thus it is that certain singers, thinking to give *éclat* and power to the note, roughly and violently contract their cords, whilst making at the same time a strong expiration. This *coup de glotte* in one phase constitutes an effort which may realize what Castex calls, rightly, "the *coup de larynx*." "In some people," he writes, "the superior vocal cords were contracted almost to contact; sometimes they even reached it.

The inferior vocal cords were roughly and strongly applied the one against the other. Everything, in a word, realized the phenomenon, known in physiology under the name of *effort*. This was not simply the *coup de glotte*, but, forgive the expression, the *coup de larynx* in its entirety. The note goes out dry and as if crushed."

The whole danger, then, consists in the exaggeration of the physiological act, especially in the exaggeration in the air tension, resulting either in an excessive blast of breath or in too great a resistance of the glottic dam.

The great difficulty lies in the exact accommodation of the two antagonistic forces, the one which tends to close the glottis (contraction of the cords), the other which acts to overcome it (expiratory force). And one guesses *a priori* what becomes of the fragile reed of a light tenor or of a soprano when the bellows is, by its natural conformation, too largely disproportionate in volume and when it functionates too powerfully. Done under conditions so defective, the *coup de glotte* is fatal, even to light female voices, who are, nevertheless, obliged to use largely this procedure in their staccato passages.

Our conclusion will be that of Bataille<sup>1</sup>: "The *coup de glotte* should be made without violence, so that the muscles be not overdone by a series of

<sup>1</sup> BATAILLE, *loc. cit.*

sudden contractions and the vocal membrane injured by an exaggerated explosion of the current of air which puts it into vibration, so as not infallibly to cause lack of muscular co-ordination." We might add the failure of the voice.

One of us (Moure) has seen on several occasions produced in singers, by reason of a sudden and violent *coup de glotte*, equal, so to speak, to detonations, submucous haemorrhages and even ruptures of the thyro-arytenoid (real "laryngeal whip-cracks"), lesions which we shall describe later in detail.

## V. ABUSE OF THE CHEST REGISTER

We shall study in this chapter one of the most frequent causes of vocal abuse and one of those which, unhappily, entails in consequence the loss of a great number of voices.

We have already indicated that to climb the diatonic scale, in leaving deep notes to reach up to the higher ones, the singer was obliged to leave the so-called chest voice to pass to the head voice. This transition may be carried out in two absolutely different ways: in the first case, it is automatic, made indispensable by a functional necessity; in the second, it is voluntary; this is a kind of premature passage which anticipates the physiological obligation.

In principle, let us hasten to say, one ought not to wait until the extreme note of the register of the chest voice is reached before passing to the following one.

In reality, to push the lower register to its most remote limits always constitutes an abuse and a most grave danger; this is progressively to force the muscular tension of the cords and the tension of the breathing, conditions which realize the summation of efforts which have been described under the name of *poitrinage*, a term well known to singers, of which they do not, unhappily, appreciate, or appreciate too late, the real value.

It does not go without saying that this defective way of singing may be the appanage of our period, for at all times erudite and conscientious singers have pointed out the perils of *poitrinage*. Thus it is that, in 1723, Tosi (*loc. cit.*) wrote: "By reason of their lack of experience some masters oblige their pupils to sustain the fulness on the high notes by forcing the chest voice. The result is that the throat is a little more inflamed day by day, and if the unhappy pupil does not lose his voice completely, he at least loses the high notes."

Some singers have too often, on their own account, the very vexatious tendency of flattering the bad taste of a certain amateur public for the chest *ut*, and, to fulfil this desire, demand of the upper limits of their voice those full and powerful

sonorities which the great Berlioz called “*squaling*” (“*des engueulées*”).

Faure, on the other hand, whose authority in matters of singing cannot be discussed, thus expresses himself :

“ Without wishing to insist on the inconveniences which result from the chest voice outside its limits, with respect even to the truth of the expression, one can easily take note of the disastrous effects which this régime must produce on the voices of which it destroys the velvet, the sweetness and the intonation, even when it does not cause its complete loss. . . . The resources of the chest voice ought to be used only with the greatest circumspection. It is a weapon as dangerous as it is difficult to manage. The disturbance which the employment of the upper notes of the chest voice brings into the welding of the two registers, into the homogeneity and equilibrium of the voice, destroying little by little its charm and purity ; if it is not stopped in time, these disturbances must assuredly lead to the shaking of the organ and often even to its total loss.”

It is indispensable, if the singer wishes to save his voice and consequently to preserve it the longest possible time, to assign to him an early transition in the head register or at least in the middle register. We know, in fact, that in these two

mechanisms the reed and the bellows are, so to speak, resting, making use, for the comfort of the public and the well-being of the singer, of the system of the upper resonators.

It is therefore important to know at what point of the diatonic scale the singer must work this change.

In principle, it may be said that conscientious and experienced professors have assigned, so to speak, to each vocal range of voice the point on the key-board at which should be done in some mathematical way the transition from the chest voice to the middle register, and thence gradually to the so-called head register. From this point of view, we might add that, in our judgment, the less one sings in the chest the less one is fatigued.

In spite of all, an important distinction should be established between the different classes of singers. It is thus that in the deep voices, bassi cantanti and deep baritones, the use of the thick register is pretty nearly indispensable in a good part of their vocal scale, but just as the singers of opéra-comique, as baritones and tenors, the possessors of deep voices should remember that the more they make use of their mixed voice, the less they will suffer and the less they will fatigue their vocal organ.

The strong tenor, the true, the rare, we might say the rarest at the present time, is the only one who, by his organic aptitude and his exceptional

temptation, can go up a part of his vocal scale in the so-called chest voice, on condition, well understood, of using the most often possible, in his extreme notes, the mixed voice, according to the example of Duprez.

The light tenor and the opéra-comique tenor draw from the strengthening of their upper resonators their true timbre of sweetness, agility and flexibility ; the head voice is their appanage, it is assigned to them by the quality of their upper sounding-board, by the tenuity of their reed.

The second category concerns female voices. Here it is not doubtful (save for absolutely exceptional conformations, as may be presented by certain contralti, very rare, however), the chest register should be reduced to the strictest minimum. One of us (Moure) has always insisted in his clinical lectures on this cardinal point, that the phonetic apparatus of women is in no way built for this register, and he has often repeated to his pupils, on the subject of the employment of this special mechanism, the concise formula : " Contralto the least possible ; mezzo and strong female voices very little ; soprano not at all." However, most authors and professors of singing are agreed in recognizing the truth of this assertion, for the number of voices broken by the abuse of the chest register is considerable.

Here are, however, shown in a table, according to Montagné, the places in the gamut at which the transition should be made for each class of singers.

The three registers of chest, middle and head are there delimited for each range of voice. These are evidently limits made artificially for the needs of a method, for it is plain, after what we have said, that all vocal organs do not run up exactly in the types thus created, and that the more the pupil will be brought to pass his voice rapidly to the upper register, the more the preservation of his reed will have gained thereby.

DELIMITATION OF THE REGISTERS ACCORDING  
TO THE VOICES

*Transition Notes (according to MONTAGNÉ)*

SOPRANO

A musical staff in G clef. It is divided into three sections by vertical dashed lines. The first section, 'Registre de poitrine', contains notes on the first four lines. The second section, 'Registre médian', contains notes on the first three lines. The third section, 'Registre de tête', contains notes on the top two lines. Above the staff, the word 'Except.' is written above the top line, and 'Registre de tête' is written below the top line.

MEZZO-SOPRANO

A musical staff in G clef. It is divided into three sections by vertical dashed lines. The first section, 'Registre de poitrine', contains notes on the first four lines. The second section, 'Registre médian', contains notes on the first three lines. The third section, 'Registre de tête', contains notes on the top two lines. Below the staff, 'Except.' is written above the first section.

## CONTRALTO

Registre de poitrine : Registre median : Registre de tête

## TENOR

Reg. de poitrine : Registre median : Registre de tête

## BASSO PROFONDO

Registre de poitrine : Registre median : Registre de tête

## BASSO CANTANTO

Registre de poitrine : Registre median : Reg. de tête

## BARITONE

Registre de poitrine : Registre median : Registre de tête  
except.

## VI. DEFECTIVE USE OF THE UPPER RESONATORS AND OF THE SPEAKING-TRUMPET

We know, by the statement which we have made in the course of this work, and particularly in the preceding chapter, that the play of the resonators essentially under the control of the will has for its object :

1. To give to the sonorous tube the form and dispositions necessary for the production of the vowels, a matter which we dismiss from this list, for it would carry us into the study of all the defects of pronunciation.
2. To give to the sonorous waves at the moment of the alteration of register a strength sufficient to compensate for leaving the lower sounding-board.

But we know that the fusion of the various registers is worked in two ways, either little by little, thanks to a progressive diminution of the thoracic resonance with a putting into partial action of the upper resonators (enlargement of the pharynx by lowering of the larynx and "support" for the note on the palatine vault), which constitutes the middle register (mixed voice), or at once by maximum enlargement of the buccal, pharyngeal and naso-pharyngeal cavities. To work this last sudden substitution of the resonators, the pupil, the singer, and even the actor can go wrong and

employ defective methods of which we shall consider the principal.

1. *The matching of the upper cavities is incomplete or insufficient.*—When this sounding-board has not the volume necessary to allow it to proportion its resonance to that which the thoracic box gives, or when the note is not sufficiently condensed and enclosed in the sonorous tube, the head utterance is blank ; the reed and the bellows are over-worked to give a greater amplitude to the fundamental glottic note and to make up by the intensity for this want of timbre. The voice has no homogeneity. The contrast between the different sonorities of the head and chest registers is thus too accentuated.

2. *The accommodation of these resonators is unequal.*—At other times the resonance is not distributed equally in these cavities, and when it predominates in one or other of them, the timbre gets certain defects, which we cannot study here without going out of our way. To quote only some of them, it is said that the note is guttural when the pharynx especially is used as a *point d'appui* ; nasal or snuffling when the reinforcement is especially made in the nasal fossæ, etc.

3. *There is antagonism, or conflict, between the arrangements of the upper resonators matched for articulation and prepared for the reinforce-*

*ment of the note.*—Certain so-called open vowels, *a* for example, are uttered in the chest voice, with a shortened sonorous tube, a relaxed pharynx, conditions which are opposed to those which ought to take the supra-glottic cavities to reinforce the note. If the singer does not modify these open vowels, he is obliged automatically to prolong the lower register beyond its normal limits ; in a word, he is forced to abuse it. To adapt them to the form of the sonorous tube, lengthened, lightly in the middle mechanism, as completely as possible in the upper register, he must modify, disfigure it, and begin to “round” them in the mixed voice (*a* becoming *â*), and to quite darken them in the head voice (*â* becoming *o*).

4. *The speaking-trumpet is badly prepared.*—In middle register and in head register the buccal orifice is found lightly narrowed and projected forwards to condense the notes in the supra-glottic resonators. If it is too open with an insufficient projection, the sonorous waves do not take their echo in these registers ; the voice becomes blank, without timbre. If it is, on the contrary, too narrowed, the voice becomes woolly, too much darkened, stifled in the mouth ; in a word, it has no outlet, and at the theatre “does not pass the footlights,” according to the established expression. The singer hears himself well, but the public does

not hear him as well. It is to be noted, however, that when an artist or an orator use their speaking-trumpet well and the resonance of the hall, they hear themselves badly, but their voice carries well, even in the more soft *pianos*, and the problem is solved.

From the several considerations which have preceded, one can see how the defective uses of the resonators can vary, and it will be understood that we confined ourselves simply to pointing out the principal defects, without studying them all, which would have carried us too far.

## VII. COMPLETE PRODUCTION EXACTED FROM THE VOCAL APPARATUS WITHOUT SUFFICIENT IMPULSE

“The voice,” Crosti<sup>1</sup> has said, “like the diamond to which it has been so justly compared, is only found in nature in the rough; it is the jeweller and the lapidary, the professor in a word, upon whom devolves the task of polishing it, of shaping it,” and, we may add, of not breaking it by wishing to give it all its lustre.

Every singer, in fact, even endowed with what is called a “ready-made voice,” with a range of voice naturally complete and rendering perfect physical abilities, should pass a long period of slow

<sup>1</sup> CROSTI, *Gradus du chanteur*.

and regular impulse. The exact adaptation of the bellows to the reed is not alone the result of an anatomical harmony ; it still permits of a functional accommodation which can be given only by education. The exact use of the registers is only obtained by apprenticeship. Vocal gymnastics rationally and physiologically conducted develop the musculature of the cords, augment the pulmonary capacity, and teach how to measure exactly the necessary expenditure of air. The larynx, just like the other organs of the economy, can give a complete and regular yield only if it is patiently, methodically, and long carried on.

The pupil who seeks from the beginning of his studies to frame his voice within the conventional limits which are assigned to him by the necessities of a repertoire, who wishes to reach as quickly as possible the extremities of the keyboard which devolves on him by his constitution, may be compared to the athlete who would begin his impulse by lifting the heaviest weights. Thus it is that a singer having, by his anatomical structure, an organ which should make of him what it is expedient to call a strong tenor, ought well to keep himself from singing from the commencement with the volume of voice which his conformation allows ; for he is certain, in thus acting, to wear out rapidly a robust reed, but one which lacks the

impulse sufficient to resist violent efforts of the breathing which puts it into vibration, and the shock which results from the putting into action of all the powerful resonators which surround it. Proceeding thus, the more the natural range of voice is short, the greater are the dangers. If the high notes are wanting, this is a constant stretching which is most painful and most laborious. If the deep notes are especially absent, it is asking of the cords a continued effort of stretching, difficult, if not impossible, to realize. It is, on the contrary, on the middle part of the range that the first impulse should bear. This rule is not new, since Tosi,<sup>1</sup> in 1723, wrote : "It is little by little that the master should seek to conduct the voice of the pupil towards the high notes, so that, by a moderate and easily directed exercise, it may acquire all the compass possible." It is a first *point d'appui* that must be found and given to the voice, as Faure says, by seeking the medium note which has the best qualities of sonority and the most facility of utterance, and which he calls the "type note." It is on either side of this note that the impulse should be made progressively towards the extremities, "the matching of the vocal scale," and it is thus that, little by little, the

<sup>1</sup> Tosi, *L'art du chant*. Translated from the Italian by Lemaire.

two high notes are acquired that are often lacking at the commencement of the studies. The work of acquiring the low notes should be done with much tact and moderation, for *poitrinage*, with all its dangers, becomes incumbent in these cases, since it is not possible to give the cords more length than they naturally possess. The fact of deep toning then requires the exaggerated use of the lower sounding-board, which overworks and abuses the reed and the bellows.

Let us hasten to say, with most professors of singing, that the enthusiasm which prepares a singer by hard labour and by theatre tests is actually too shortened by the majority of pupils in a hurry to obtain as quickly as possible their place as artists. It is deplorable that the voice may not be followed in its evolution and formation, and that it may not be utilized from use with an interruption at the time of breaking. This precocious culture should be done prudently, for one of us (Moure)<sup>1</sup> has frequently demonstrated that studies made in the chest voice of solfeggio parts of deep range of voice have resulted in serious disorders, especially nodular laryngitis.

The old free institutions had nevertheless the greatest advantages, and their disappearance may be regrettable, from the express condition that

<sup>1</sup> MOURE, *Revue hebdomadaire*.

children were only admitted to them after a serious examination, that they received there instruction conformable with the exigencies of their delicate organ, susceptible of undergoing variations at the moment of breaking, variations especially noticeable in boys.

Pupils thus selected presented the necessary fitness, their vocal powers were developed gradually, the voice acquired naturally the resistance which is lacking in most artists early and insufficiently drawn to the time when they come on the scene, on which they very often make only a short appearance.

## CHAPTER V

### ABUSE OF THE SPEAKING VOICE

WHAT we have said on the subject of the abuse of the voice in singers may be applied to all those who use the speaking voice before a more or less numerous public, such as orators, advocates, preachers, tragedians, professors, and, in particular, schoolmasters and schoolmistresses.

In these, as a matter of fact, the same defects in their way of using the bellows, the reed, and especially the resonators, carry with them the same disastrous effects at the level of their vocal cords.

The professional of the speaking voice who uses the chest register too largely, who does not know the opportunity, at one time or another, of resting his vocal organ by using the mixed voice (diminished chest voice), since he cannot think of making use of the so-called falsetto register, soon comes to fatigue, overwork, and vocal deterioration, often irreparable, which leaves an organ hoarse and disequilibrated for ever.

We have already long pointed out (Moure) that

vocal disorders were much more frequent in subjects having a small larynx than in those having a thick-set and resistant vocal organ, generally those with deep voices (bass and deep baritone in men, contralto in women).

It is, in fact, rare that the small larynx of the light tenor or high soprano resists for long the fatigue exacted by the exercise of the speaking voice, and we have already made the observation (Moure) that school mistresses of small larynx were rapidly tired and presented very early the morbid deteriorations which we shall describe as resulting from abuse of the voice.

One cannot imagine a real tragedian constantly obliged to make pathetic recitals with a small larynx and a reed made for the high range of voice. This is an observation important to note, and especially to thoroughly understand, since we may be called upon at one time or another to give advice as to the individual predispositions of this or that subject to take up this or that career. The specialist should, therefore, be able to say if this or that subject whom he examines appears to him to be well or badly formed from the physical point of view, and if the vocal organ appears to him to offer the desired degree of resistance to do the work to which it is to be submitted, after an impulse often most mediocre, sometimes absolutely *nil*.

## CHAPTER VI

### EFFECTS OF ABUSE

THE various causes of abuse which we have studied are susceptible of bringing with them a series of disorders, important to understand even before they may become quite characteristic, and a practitioner careful of the interests of his patients should know how to foretell the moment almost when they begin to be produced.

To take note of the functional or organic disturbances which abuse of the phonetic apparatus may bring, it is enough to remember the delicacy of structure and the complexity of organization of this admirable instrument, and especially to consider the intimate connection which exists in the function of the different parts which constitute it (cords, breathing and resonators).

We know that the different tonalities of the voice correspond to a real gamut of well-arranged contractions of the tensors of the cords, and especially of the thyroarytenoid muscle. There works, in fact, in this muscle a series of modifica-

tions, imperceptible to the sight, in its tension, density and thickness. These are imperceptible shades which experiment has never been able to reproduce or imitate, but which, nevertheless, allow us to understand how an influence, even slight, may disturb a similar dynamism. The least exaggerated work, a prolonged effort, and especially the bad functioning demanded of the organ, is capable of altering the elasticity of this muscle, of disturbing its nutritive processes, and of modifying its functions. The ligament and the mucous membrane hiding it, in transforming it into a vibrating surface (head register), evidently requires, to give the yield demanded, to be treated with circumspection. The epithelium which lines the inner border of the cords and of the part where they meet may be altered by a too rough friction. The relaxation of the elastic fibres of the ligament, caused by excessive or badly calculated tension, the exaggeration of the glandular secretion, the vascular disturbances, are so many results of a too intense over-activity.

The qualities of sound then become at the mercy of all these changes, and one may say, even as Botey writes, that the "larynx has not been made for song, but solely for speech, for ordinary conversation, being given the facility with which it is fatigued and disarranged by the least over-

work, the least prolonged effort, the smallest error of the rules of hygiene and vocal utterance."

We cannot evidently entirely approve this proposition of the Spanish author; it is, moreover, an original caprice, for it is indisputable that a larynx well adapted to a well-formed phonetic apparatus, if it is prudently and normally conducted and impelled, should long stand regular work. It is necessary, nevertheless, that master and pupil should know the ever imminent perils which threaten so important an organ.

The bellows is quite as delicate as the reed, for its elasticity depends entirely upon its functional activity. In the long run, if the air stored up each time is too considerable, if it is driven with too much violence to meet a resisting reed, if, in a word, in a constant and excessive tension the vast network of elastic fibres which surrounds the pulmonary alveoli is allowed to distend, it recoils with difficulty during expiration. In this case the reservoir is badly emptied, the quantity of immovable and residual air increases to the detriment of the tidal air. The pulmonary vital capacity is lessened, and from this fact the motor energy which puts the glottis in vibration is notably diminished. Thus emphysema is installed with all its consequences.

The intimate connection which unites in their

function the various constituent parts of the phonetic apparatus explains the rapid recoil on their entirety of the dynamic or organic disturbance of anyone among them.

In the normal function, well conducted, the bellows regulates the expenditure and pressure of the air to the exact requirements of the work of the reed, not only to make it vibrate with a fixed energy, but further to help the tension of the cords, as Lermoyez has particularly demonstrated in his inaugural work (*loc. cit.*) ; the resonators are accommodated to give a special colour to the fundamental glottic note and to reinforce it—that is to say, to lend a powerful support to the bellows and the reed.

When, in abuse, one of these disturbed organs begins to lose its functional activity, the substitution of the others comes in within the limits of the possible, and by an increase of work they endeavour to maintain the natural equilibrium. This mechanism of compensation is comparable to that which is established in the other apparatus of the organism, the circulatory apparatus, for example. As the heart increases its energy of contraction when the elasticity and contractility of the arteries diminish, so the breathing compensates, so to speak, by a more active systole, by a more powerful play of air, the weakening of tension of the

cords. This mutual help lasts up to the time when the organ is overdone by this excessive work. The pulmonary elastic fibre then suffers the same fatigue as the cardiac muscular fibre. The inspiratory "diastole," the replenishing of the air reservoir, begins to weaken. In this place the respiration becomes more frequent, a phenomenon analogous to the tachycardia of a heart which contracts more often when its force of contraction is diminished. The failure of compensation is from that time nigh at hand. The breathing progresses towards its asystole, if it is possible to employ this expression. Like an overworked heart which is dilated, it allows itself to distend before the obstacle and resistance of the reed. It loses its elasticity—emphysema has arrived.

To the fatigue or disorder of the reed is added that of the bellows. To a local disturbance has succeeded the throwing out of gear of the whole phonetic apparatus, the functional disorder has created the lesion. Is not this the whole pathogenesis of abuse?

### I. FUNCTIONAL DISORDERS

It results from what has preceded, that a division occurs in the semeiology of abuse. It is necessary to give a share to the functional dis-

turbances which often precede and usher in the organic lesions before accompanying them. The first disorders brought into the normal physiological condition of the organism are interpreted by a series of phenomena which are so many indications of the weakening of the dynamism of the phonetic apparatus and which foretell its complete failure.

These are what we shall call, by analogy with the manifestations of commencing renal insufficiency, "slight signs of abuse" to which we attribute considerable importance, for they may occur at a time when our means of investigation (pulmonary auscultation, spirometry, laryngoscopy) give us only little or no indications. It is, so to speak, the auscultation of the singing voice which reveals to us these early disorders.

1. The singer whose apparatus thus begins to be altered loses from the very first what may be called the regular holding of the note; his breathing becomes tired, he cannot sustain in a regular and constant manner the tension of the air which he transmits to the level of the vocal lips. On the other hand, the contraction of the latter is unequal and incomplete, or, to speak more exactly, irregular, which gives a kind of tremolo to the singing voice. After each period of exercises which demand more considerable efforts than normally, the singer is fatigued, his neck muscles

(sterno-mastoid, trapezius, etc.) are almost painful from the functional overwork to which he has submitted them.

Further, the attack of certain notes (particularly those of transition) in piano or in half-tint, is not as easy as it was at the commencement of study ; the singer knows it himself much more than the listener hears it ; he is obliged, to attack certain notes, to hold them and to spin them out, to make a more considerable effort than he made formerly, when his reed and bellows were still in a perfect condition of equilibrium.

The glottic adaptation is not made either as easily or as well, and the singer "attacks on the breath"—that is to say, the note produced is often a little below the tonality which it should have. From this fact, the voice loses its precision and especially its freshness (softness of tone).

The transition from one register to another is no longer homogeneous, it is difficult, and obliges the singer to take precautions so that his reed is not relaxed, and that consequently the air does not filter across the cords to produce the phenomenon well known under the name of *diphthongia*.

The different shades of vocal utterance are especially very easy to observe during the emission of the vowel E, under the laryngoscopic mirror (Moure). Thus it is that some singer, who can by

watching himself, especially if he is already a little impelled to sing, conceal almost completely this or that prodromal sign of commencing fatigue, will be, by contrast, absolutely impossible to attain the same result during laryngoscopic examination. At that time, the note, given in the head voice to obtain the raising of the epiglottis, leaves almost always masked, and the practitioner easily perceives that the air passes across the vocal cords by producing that kind of breath characteristic for whoever knows its value and understands how to distinguish it. This symptom is always the result of a fault of sufficient contraction of the vocal reed, and consequently of a certain degree of relaxation of the vibrating part of the cords, especially of the thyroarytenoid muscle.

At this premonitory stage, so to speak, of abuse, one observes equally in singers a certain degree of breathlessness, the artist being obliged, in order to obtain the effect which he wishes to produce, to expend a greater volume of air than he would do normally.

2. A little later, and in some cases almost at the same time as the slight disorders which precede, one sees a certain degree of hawking appear; and as the glandular secretion augments more than is proper, it produces at the level of the cords a deposit of viscid mucous, adherent to the edge of the cord; to get rid of it, the singer and the orator as

well are obliged to make a frequent "hemming," which, unhappily, produces in its turn a local irritation which facilitates or exaggerates this same secretion which they seek to expel.

When the artist comes to present this series of functional disorders, he generally requires, before singing, to excite his voice, to free his larynx ; it is sufficiently habitual that in the morning, on waking, he may be hoarse and under the necessity of effecting a regular clearance of his upper air passages.

On the side of the nasal fossæ even one sees appear a series of functional disorders characterized by the often permanent swelling of the inferior turbinals ; from this fact the passage of air through the nose is done badly, the singer is thus forced to respire almost exclusively by the mouth ; the resonators are thus more or less obstructed, which obliges him to produce a tension of the cords and of the breathing much more considerable than he ought for the note to be produced. However little it may be predisposed, his naso-pharyngeal mucous membrane secretes in its turn and the mucous then penetrates into his larynx to augment the hawking which has been already produced at the level of, or around, his vocal cords (ventricles of Morgagni especially).<sup>1</sup>

<sup>1</sup> Here are, according to Professor Téqui (of Paris) the pieces, in some way typical, or for test, by the aid of which one may

When this store of so-called prodromal signs of abuse, and even of overwork in some cases, has reached its apogee, if the professional of the speaking or singing voice does not take into account

recognize, almost from its commencement, the fatigue of the singer's voice.

For diseased organs almost any air suffices to recognize the fatigue of the voice, and particularly for :

Strong Tenor : Grand air from *William Tell* ; Air from *Trovatore* ; Romance from *Aïda* ; Sommeil from *La Muette de Portici*.

Second Tenor : The two airs from *La Favorita* ; Cavatina from *Faust* ; Romance from *Les Huguenots*.

Light Tenor : Air from *La Dame Blanche* ; Air from *Il Barbier* ; Romance from *Carmen* ; Air from *Manon (Saint-Sulpice)*.

Bass : Grand Scene *valse infernale* ; Malediction from *La Juive*.

Basso Cantanto : Air from *Le Chalet* ; Couplets from *Lakmé* ; Serenade from *Faust*.

Grand Opera Baritone : Air from *La Favorita* ; Air from *L'Africaine* (Act 4, not in Act 2) ; Air from *Rigoletto* (courtesans' scene).

Opéra-Comique Baritone : Air from *Le Maître de Chapelle* ; Air from *Il Barbier*.

Dramatic Soprano : *L'Africaine* (Fan Song in Act 2).

Second Soprano : Air from *Rigoletto* ; Air from *La Traviata* ; Mad song, *Hamlet*.

Light Soprano : Air from *Les Huguenots* ; Valse from *Roméo* ; Valse from *Mireille*.

Mezzo-Soprano : Air from *Aïda*, Act 3 ; *Hérodiade*, Act 3 ; *Robert*, "va, dit elle."

Contralto : *Samson*, "Printemps qui commence. . . ." "Amour, viens aider."

Mezzo-Contralto : Air from *Le Prophète*, "Oh ! priests of Baal" ; Air from *Le Roi d'Ys*.

the dangers which menace him, these various disorders increase in intensity, and, to the hawking or trembling at the beginning, more considerable vocal disorders come to be added.

The half-tints are almost impossible to obtain correctly; the middle is weakened, it becomes dull and colourless, and each time that the singer wishes to pass from one register to the other, he experiences the greatest difficulties, often even, if he strives beyond the limit, his voice breaks and he produces the disagreeable "couac," the result of the involuntary transition from one register to the other with sudden return to the original register, as Bataille has so well explained it. It is a real vocal crack, by the sudden relaxation of the reed, which, unable to sustain the effort, allows the air to pass, returning almost immediately to the degree of tension which it had before.

In other cases, there is the phenomenon called "roulette," so disagreeable for the audience, a symptom which is often the consequence of a serious lesion of the vocal cords which we shall study a little farther on.

3. In a more accentuated degree, there is the complete hoarseness and the impossibility for the singer to count on his voice with any regularity. After having done somewhat painful work, the artist is obliged to rest himself for several days.

His voice becomes irregular, unequal; he cannot seriously count upon a vocal organ to never compromise him which goes fast towards final bankruptcy. Here is the end of the career, which comes too often, alas! before it is well begun.

Sometimes the progress of the vocal disorders is, so to speak, sudden and brutal. It is in the middle of a piece requiring a violent effort, such as the "Suivez-moi" of *William Tell*, that the singer suddenly feels his cords let go and his voice fail. It is in an orator during a phrase hurled with too much energy (under the impulse of choler, or other excessive sentiment) that the same phenomenon is brought about. There is then more or less complete aphonia, and the impossibility of uttering a sound without feeling real pain.

## II. ANATOMICAL LESIONS

If we now study the different morbid changes to which correspond the functional disorders which we have explained, we shall see that :

1. *In the premonitory stage* the laryngoscopic indications are sufficiently little marked to pass unperceived if one has not made a minute and complete examination of the singer who comes to complain of those little nothings which are the prodromal signs of vocal abuse.

Too often, again, the specialist has the tendency

to attribute the lesion ascertained to a cold, a chill, or quite other accidental cause, when in reality the disorders observed are the consequences of a fault of method or of a bad functioning of the organ examined.

At the commencement, one sees at the edge of the vocal cords a slight degree of redness and especially a cord which is not absolutely flattened, *regular* and *stiff* as it should be if it were quite healthy. The edges of the cords have not their normal sharpness. These latter are not brilliant and pearly, an indispensable appearance in female larynges, particularly in sopranis, whose reed is more fragile and delicate and requires all its purity to give the yield which the singer exacts from this organ. Let us hasten to add that, in a general way, in men even healthy cords are grayish, without brightness, but their edges, if they are healthy, ought to be, nevertheless, flattened and well-stretched.

2. *In the second stage*, during laryngoscopic examination, one sees accumulate at the level of the anterior third of the cords a milky product (exudate which takes this colour from its adhesion to the vocal cords and the churning it undergoes under the influence of the vocal vibrations). These mucosities are very adherent, difficult to detach, and resemble in some cases a true nodular hypertrophy, with this difference, that the singer can displace

it, expel it even, and that the wool-carrier easily makes it disappear.

The vocal ligaments are grayish or even a little pink ; their border, instead of being flat, is very slightly rounded, sometimes even, during the emission of the vowel E, they do not stretch in so clear and energetic a way as in the normal state. They are slightly waved, and if during the laryngoscopic examination the singer is asked to go up part of the gamut, it is seen that the changes which ought to be produced at the moment of the passage from one register to the other are badly executed ; often they are impossible.

If the voice trembles, one easily makes out the undulations of the cords, thanks to the mucosities which habitually cover them in these cases.

3. *At a more advanced stage*, a real undulation is observed, for want of regular contraction of the tensor muscles, the thyroarytenoid in particular ; one then notes the formation at the level of the anterior third, or sometimes even of the posterior fourth (very rare), of a kind of little projection, of a tiny belly of the vocal ribbon, which divides the glottic reed into two parts—the anterior one very short, the posterior longer, or reciprocally when the projection is posterior.<sup>1</sup>

<sup>1</sup> The posterior projections are scarcely observed but in deep voices—bassi cantanti and some baritones.

This is the stage of vocal asynergy and of muscular relaxation, in consequence of the intermittent vocal disorders, from which follows the formation of a localised hyperkeratosis precisely at the points where the little projections whose presence we have pointed out exist. This is the nodular formation by localised hypertrophy at the free edge of the cord.

Here we admit, with other authors, however, that two kinds of nodules exist—one muscular, consecutive to the paresis of the inner fibres of the thyroarytenoid, the other resulting from a partial and local thickening (true corn) seated at the same spot, the anterior third of the vocal ribbons. Always we consider (Moure) that the true nodular hyperkeratosis succeeds almost always to the vocal asynergy (muscular nodule). This is, to our mind, the reason that constitutes its gravity and the small chance that one has of curing, even by a well-executed operation, the singers who present this laryngeal change, that it must be considered as serious from the vocal point of view. It is, however, very important not to confuse the true nodules, generally symmetrical, with the simple miliary cysts at the free edge of the cords, well described by our confrère Garel, nor with small polypi, for the prognosis of these kinds of lesions is usually favourable.

We do not wish to stop here to discuss the

pathogenesis or pathological anatomy of these nodules, for the subject has served as the theme of numerous and important works to which we will content ourselves by referring the readers whom this question may interest. We will simply state that if they are recent and in process of formation, they may disappear with rest sufficiently prolonged and change of vocal method, but that if there is local thickening of the edge of the cord, rest diminishes them, without making them disappear completely.

4. *In the last stage of abuse* can be found on the edge of the cords true erosions, redness, sometimes even submucous haemorrhages, localised or diffused.

Finally, in the most serious cases one finds, under the influence of an exaggerated vocal effort, not only sanguineous effusion under the mucous membrane, but also rupture of some fibres of the internal thyroarytenoid, a lesion which one of us (Moure) has described under the name of "laryngeal whip-cracks" (*coup de fouet laryngien*). This last lesion is very serious, for it compromises the singing voice for ever, and profoundly alters the speaking voice.

Such are, to sum up, the effects of abuse on the laryngeal mucous membrane—that is to say, on the important part of the vocal instrument. In a last chapter we shall briefly set out the treatment of these various morbid changes.

## CHAPTER VII

### TREATMENT OF THE EFFECTS OF ABUSE

THE part of the laryngologist does not consist merely in treating the disturbances due to abuse, which are, so far as we can judge, often very analogous to those caused by other influences (cold, infection, etc.), a fact which renders them amenable to the usual therapy of our speciality. It is for us, above all, to trace their true cause and to add to our ordinary curative powers practical advice which should have the value of prophylactic treatment.

Thus it is that we ought always to be put on the alert in the presence of a voice professional, hawking, easily becoming hoarse, and therefore not having an easy utterance, presenting, in a word, what we have called "slight signs of abuse," then laryngoscopic examination will show only very superficial and not very condemnatory morbid changes. One must be careful not to attribute at once these valuable warnings to a cold, for example. We should endeavour, on the contrary, to hold a

## TREATMENT OF EFFECTS OF ABUSE 109

regular inquiry into our patient's method of singing or of declamation, by assuring ourselves by examination of the phonetic organs (cords, breathing, resonators) if the range of voice is natural and well conformed to these physical powers. We should find out whether our subject does not abuse the chest register, and, in a word, if he does not fall into the serious physiological errors which we have studied in this work. We shall then be able to sketch out for him the indications for a new direction of instruction and of corrections to be used for his old method. We shall prescribe a preliminary rest of the function, *the silence cure*, which will allow the organs to repair their exhausted dynamism and the tissues to diminish their cellular activity.

If these abused persons are come to a more marked phase of symptoms (as these described in paragraphs 2 and 3 of Chapter V.), one can assist the rest cure by decongestive powders, a few touches of the laryngeal mucous membrane made at intervals with a weak solution of chloride of zinc or nitrate of silver (10/0, 1/50, or 1/30), taking good care to leave intervals between each cauterisation long enough for the mucous membrane to have time to recover.

In the more serious cases, massage, electricity, or even brushing of the cords, galvano-cauterisation of

a slight thickness of the edge of the cord, may, if not cure, at least prolong the vocal life of the professional arrived at almost the end of his time.

The different treatments will find a valuable help in the mineral water cures (sulphurous, alkaline, or arsenical), capable also, according to the case or the nature of the waters, of re-establishing in a certain measure the mucous membranes and of recovering the functional strength of the organs. But our real therapy, let it be repeated again in concluding, consists, provided that we are consulted in time, of pointing out the true method of directing the physiology of the vocal apparatus into its regular and normal path.

#### CONCLUSIONS

Being given that the "Voice" constitutes real capital in a subject devoted by his natural tendencies to the professional use of his apparatus of phonation, that it can be very quickly and easily altered by an irregular, antiphysiological tendency, *it is necessary* for the teaching of singing officially instituted by the State and certain towns to offer from this point of view every guarantee and every "hygienic" security.

This preventive hygiene of abuse and of all its pathological consequences appears to us capable of realization.

1. By the initiation of singing masters and their pupils to scientific ideas susceptible of making them understand the structure and mechanism of normal and irregular function of the vocal instrument.
2. By the examination of pupils practised, at the commencement of their studies, by a laryngologist who assures himself of the organic and functional fitness of all the constituent parts of the phonetic apparatus, of which he will indicate the possible produce, thus avoiding a premature and often dangerous "classification."
3. By the medical surveillance exercised by this same specialist throughout the duration of instruction of the subjects, in order to control the behaviour of these organs as to this production and as to this tendency.

We have the conviction that this way of proceeding would allow the discovery of many more subjects fit to become true artists and would have the immense advantage not only of developing voices in a more efficacious manner, but further and especially of preserving them, instead of leading them too often to failure and ruin.

It is to do useful work for Art and Science that we invite the *Société française d'oto-rhino-laryngologie* in proposing that it shall express the following wishes, which recapitulate this end and its powers :—

## 112 TREATMENT OF EFFECTS OF ABUSE

1. No one should be admitted to study Singing, and even Declamation, without having passed a probationary examination in the knowledge recognized as indispensable to this class of masters.
2. The Conservatoires should always possess one or several laryngologists, whose care it should be to examine the pupils periodically, at the beginning, in the course of, and at the end of their studies.

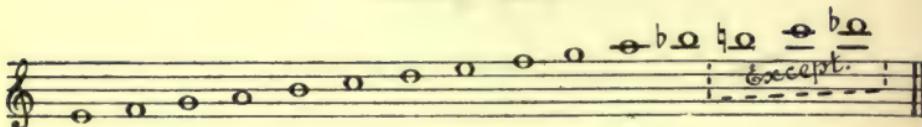
## APPENDIX

WE add to our work a sketch of the classification of voices, but we must repeat that this classification is essentially factitious and artificial and that the diversity of the subdivisions is even far from corresponding with the truth and from being adapted completely to the exigencies of the modern repertoire.

We borrow from the method of Faure the musical staves which lay down the limits of the vocal scale assigned by convention to each variety of voice. We shall follow with technical considerations which we owe, in great part, to the kindness of M. Téqui. We have, finally, thought that it would be interesting to place before the eyes of our readers the reproductions of certain blocks (the property of the review *Musica*) in order to show well the differences of appearance of certain subjects endowed with a typical voice. The characters which we have assigned, in our work, to the "Architecture" of the singers whose phonetic apparatus is in perfect harmony with the requisite production, will thus be recognised.

## MALE VOICES<sup>1</sup>

## STRONG TENOR



Voice characterized not by its extent, but by its power and volume, products of exceptional physical powers (strong bellows, powerful larynx, spacious resonating cavities).

The strong dramatic tenor, called in Italy *tenore serio*, or *tenore eroico* and in France simply *fort ténor*, formerly scarcely went beyond the *la ♭ la ♯* above the compass,—deep notes sonorous, medium considerable, high powerful, but limited. His repertoire was Bellini's *Norma*, Rossini's *Otello*, Mercadante's *Le Bravo*, Spontini's *La Vestale*, Weber's *Der Freyschutz*. He was personified in Italy by Nozzari, Crivelli, Donzelli, Guasco, Reina, and in France by Marié, Silva, etc., all dramatic, powerful voices, but very short.

The public, insensibly habituated to the shrill sonorities, brilliant and exceptional, of Duprez, Tamberlick, Renard, Gueymard and others, came thereby to commit the regrettable error of preferring power to charm, effort to ease ; it is thus that, little by little, the range of voice of the strong dramatic

<sup>1</sup>The Tenor scales must of course be read an octave lower than they are printed.

tenor of which we have spoken above is found altered—a range of voice which, natural in principle, has become, so to speak, artificial and forced.

The repertoire of the strong tenor, such as one wishes it and as one hears it to-day, is *La Juive*, *William Tell*, *Robert le Diable*, *La Reine de Chypre*, *Otello* (Verdi), etc.

The most celebrated have been, in Italy: Mongini, Wachtel, Tamberlick, Tamagno, etc., and in France: Duprez, Lafon, Espinasse, Renard, Gueymard, Villaret, etc. (In England, Lloyd Chandos, Charles Saunders.)

Opéra Tenor

(called transition, second character, or lyric tenor)

## OPÉRA TENOR

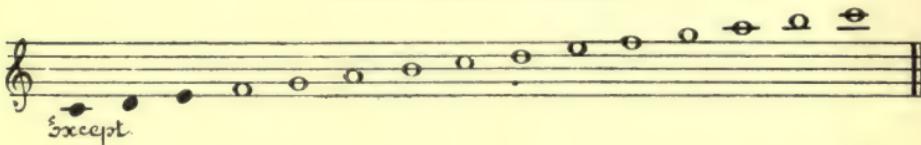
Except.

Called also *first tenor*. Has the same extent of voice as the strong tenor with less volume. Ought to use largely the middle and head registers.

His repertoire is, in Italy : *Il Trovatore*, *Aïda*, *La Forza del Destino*, *Rigoletto*, etc.; in France : *Les Huguenots*, *L'Africaine*, *Faust*, *Sigurd*, *La Favorita*, *Lohengrin*, etc.

The best known with this style of voice have been, in Italy : Moriani, Giughini, Rubini, Mario Gordoni, Masini, Gayarré, Nicolini, etc., and in France : Nourrit, Roger, Collin, Poultier, Sellier, Michaud, etc. (In England, Walter Hyde, Francis MacLennan.)

## OPÉRA-COMIQUE TENOR



Voice less ample than the preceding, taking its true character from the use of the upper resonators. This character is also more decided in the true light tenor.

The first *opéra-comique tenor* has, to-day, a very great analogy with the second character tenor or first opera tenor ; without having the amplitude, he often has the dramatic side of it ; the same range of voice with more charm, more suppleness and more ease. The true *opéra-comique* style having almost disappeared from the repertoire, has been replaced by the lyric opera, of which this last is the tenor.

The repertoire is : *Roméo*, *Werther*, *Carmen*, *Manon*, *Louise*, etc.

Its representatives : Roger (before going to opera), Achard, Talazac, etc.

(Opéra-comique does not exist in Italy, and the repertoire, in general, only requires two styles of



FIG. 10.—LYRIC SECOND TENOR

tenors, "il tenore drammatico," and "il tenore leggiero o di grazia." All the above parts are sung by the opera tenor.)

*The voice of the opéra-comique tenor often goes*

by becoming thin towards the high notes ; and, losing almost every character of virility in the middle, it lends itself more easily to the expression of tender, delicate sentiments, to vocalisation and its accomplishments ; and this is the true light tenor of the real opéra-comique style (almost a woman's voice).

His repertoire was formerly very varied (it is less nowadays), always of a light character approaching almost to operetta, and passing by the opera "Buffa" : *Le Barbier de Séville*, *Le Voyage en Chine*, *Si j'étais roi*, *Mireille*, *La Dame Blanche*, *Mignon*, *La Fille du Régiment*, etc.

Its representatives : Calzolari, Garat, Ponchard, Montaubry, Capoul, etc. (In England, Ben Davies.)

### *Baritones*

Voice intermediate between the bass and the tenor.

The ordinary compass of this voice only ranging from the deep *la* ♭ (key of *fa*) to *fa* ♯, *fa* ♭ above the line, one is tempted to say that this is the most *natural* voice ; there is the deep or low baritone—that of which we have spoken—(of Donizetti) and the high or tenorised baritone (of Verdi). Both have a dramatic character, and are used in grand opera or opera "Seria." Rossini defined, it is said, the baritone as : "the miscarriage

of a bass who cannot go down or of a tenor who cannot go up." The definition is, perhaps, true, but what is certain is that Rossini, then Verdi, and after them almost all the other composers, in pushing the voices of dramatic tenors to *si* ♭ and to *ut* ♭ have been compelled to raise up to *sol*, *sol* ♭ even, the baritone voices, and they have thus displaced their natural range of voice. These baritones, called *Verdi baritones*, are now no more than deep tenors, and nothing differentiates them from the old dramatic tenors of the Italian school of which we have spoken above, such as Donzelli, Reina, Davide, and others.

## HIGH (OR VERDI) BARITONE

The Verdi baritone is a dramatic baritone of very high range; the deep part of the voice is generally a little weak, the middle very sonorous, the high very brilliant, shrill, and recalling by its timbre the voice of the strong tenor.

*Repertoire:* *Il Trovatore* (Count Luna,) Carlos in *Hernani*, *Rigoletto* (Amonasro), *Hérodiude* (Herod), *Le Roi de Lahore* (Scindia), *Samson et Dalila* (The High Priest), *Sigurd* (Gunther), etc.

*Representatives*: Corsi, Pandolfini, Graziani, Ronconi, Aldighieri, etc., in Italy; Ismaël, Merly, Bonneterre, Dumestre, Devoyod, Bérardi, etc., in France. (In England, Charles Santley.)

This style of voice must not be confounded with that of the *Martin* baritone, which is also a baritone of high range, but which belongs to the light style of opéra-comique and of operetta, conspicuous by its ease, agility and grace. Martin was the type of this style of voice.

*Representatives*: Pellegrini, Galli, Santini, etc., in Italy; Martin, Chollet, Mocker, Barré, Soulacroix, etc., in France.

### Basses

This voice, which occupies the lower scale of the human voice, is rarely true and complete. It extends naturally from *fa* deep to *do*, *do* ♯, *ré* ♭ above the stave (key of *fa*). Such is, in general, its range. Its middle is sonorous, but hard and little pliable, the deep cavernous, giving the effect of an organ pedal, and the high difficult, often missing precision and homogeneity. We shall distinguish the *deep bass* (called also *basse-taille*, *basso-profondo*, *basse noble*) and the *basso cantando* (called also *opéra-comique bass*).

In the old French opera only fine deep notes were required of the bass, to render with full voice

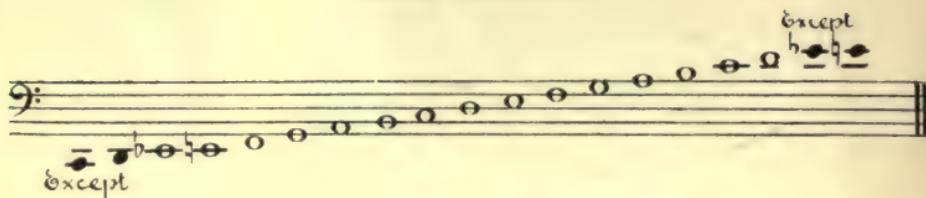
recitative always pompous, lingering and majestic, of which alone his parts of high priest or heroes were composed; these were the so-called *solo* basses (*basses récitantes*), of which Derivis was the last representative.

But, in Italy, the art of singing had other requirements, and there a very supple voice was required of the bass, able to sing and vocalise like a tenor or a soprano; with Rossini, Donizetti, Verdi, Meyerbeer, came a regular revolution in musical writing, which, by running up the pitch of voices, made the bass also undergo the ascending progression of which we have already spoken concerning the tenor and the baritone; and thus a new style of bass was found created in France and made use of, with a more flexible voice and a higher range, called *basso cantanto*. This voice must not, nevertheless, be confounded with that of the deep baritone, as one is often tempted to do; their range in the deep, their volume and colour in the middle are quite different, and their chief point of resemblance consists in their high limit at *fa, fa #* above the stave (key of *fa*).

The repertoire of the deep bass is, in France, the following :—

## BASSO CANTANTO

## BASSO PROFONDO



*La Juive, Les Huguenots, Robert le Diable, Le Prophète, Charles VI., William Tell, Moïse, La Favorita, Sigurd, etc.*



FIG. 11.—TYPE OF BASS  
(Resonators, neck, etc.)

Derivis, Levasseur, Depassio, Sarda, Alizard, Obin, Belval, Gresse *père* have shone on the French stage by singing parts of this kind. (There are

no living bassi profundi at present in England, the last being Signor Foli.)

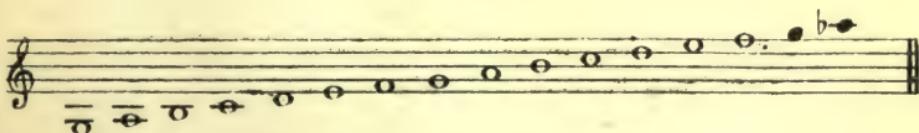
The repertoire of the *basso cantanto* comprises : *Le Chalet*, *Der Freyschutz*, *Les Mousquetaires de la Reine*, *Le Caïd*, *Le Songe d'une nuit d'été* of Ambrose Thomas, *La Fille du Régiment*, *L'Étoile du Nord*, *Mignon*, *Lakmé*, *Faust*, and all the parts of the second bass of grand opera, such as those of Saint-Bris in *Les Huguenots*, Gessler in *William Tell*, etc. (Robert Radford is a type of English *basso cantanto*.)

As to the Italian bass, he is essentially a *basso cantanto*, and he unites the two styles, dramatic and light ; his repertoire is therefore unique, with some alterations in the deep notes especially, if necessary.

Exceptionally deep bass voices occur in Russia, going down to the deep *contre-la*.

### FEMALE VOICES

#### CONTRALTO



Formerly the name of *alto* was given to the deepest female voices ; now they are called *contralto*. This style of voice was very cultivated

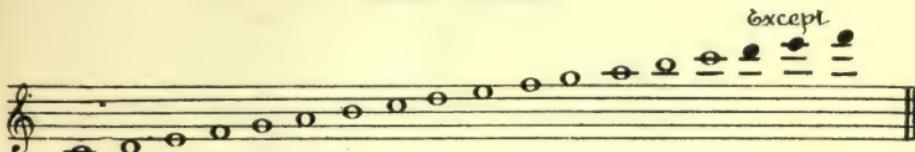
and made use of by composers (especially the Italians), who had restricted its range from *fa*<sup>2</sup> to *fa*, *sol*<sup>4</sup>. The contralto voice now exists as formerly ; but, composers no longer writing parts for the natural range of this style of organ, its education has had to alter, and one has been obliged in order to make use of this voice to make it acquire supplementary high notes by hard labour, and often to the detriment of its charm, amplitude, and equality ; by this work have been obtained, so to speak, pseudo-mezzo-contralti.

*Repertoire*.—This repertoire was formerly very considerable ; the old Italian composers very often wrote the principal male part of their works for the contralto ; the women played in disguise. Handel has written for the alto voice most often, in most of his oratorios (*Messiah*, *Deborah*, *Athalia*, *Jephta*, etc.).—Rossini and Bellini particularly affected this voice ; the part of Arsaces in *Sémiramis*, of Tancred and Orsini in the *Lucrezia Borgia* of Donizetti, have been written for contralto voices. One single part remains to the present repertoire—it is that of Gluck's *Orpheus*.

*Representatives* : Manghini, Pasta, Brambilla, Pisaroni, Alboni, etc., for the Italian school ; in France, Mme. Wertheimer, for whom was written the part of Pygmalion in Victor Massé's *Galathée*,

since sung by a basso cantanto. (In England, Clara Butt.)

## HIGH SOPRANO



The soprano sfogato, or high soprano, is the highest of the female voices; it shines especially by its exceptional height, able with ease to climb the vocal scale from *do<sup>3</sup>* to *mi<sup>5</sup>*, and even, rarely it is true, to *fa, sol, la<sup>5</sup>*. Of small volume, very easily pliable, it plays with every difficulty, especially excelling in the vocalisation and execution of all the ornaments which the art of singing comprises.

Its repertoire is composed, in France, of *Lakm  *, *Mireille*, Ophelia in *Hamlet*, *Le Pardon de Plo  rmel*, the Queen in *Les Huguenots*, etc.; in Italy, of *Il Flauto Magico*, *Lucia*, *I Puritani*, *La Sonnambula*, etc.

The best known soprani sfogati have been Sessi, Frezzolini, Jenny Lind, Patti, Nilson, Marie Cabel, Sanderson, Van Zandt, etc. (In England, Florence Smithson, Amy Evans, Melba.)

This style of soprano is much loved abroad, save in Italy, where, if it is not unknown, it is almost made no use of.

The princesses of opera, such as Inés in *L'Africaine*, Isabelle in *Robert le Diable*, Eudoxia in *La Juive*, Mathilde in *William Tell*, etc., ought not, in our opinion, to be placed among the high sopranos, but rather with the light sopranos, which we shall call *lyric sopranos*, requiring less elegance than the preceding, as Gilda in *Rigoletto*, *La Traviata*, *Manon*, Marguerite in Verdi's *Faust*, *Louise*, etc.

This voice, less light than the preceding one, although possessing the fine qualities of suppleness and agility, may show at a pinch a dramatic side, and appears to stand midway between the soprano sfogato and the dramatic soprano.

The best known singers in this style have been: Cinti-Damoreau, Marie Battu, Ugalde, Vandenheuval-Duprez, Miolhan-Carvalleo, Heilbron, etc.

#### DRAMATIC SOPRANO



The voice of the dramatic soprano possesses almost the same compass as that of the high soprano, but differs therefrom in that it is more full, more voluminous, and less apt at vocalising. It is, in relation to the high soprano, what the

first tenor of opera is to the light tenor of opéra-comique.

The *strong female voice* is a variety of the dramatic soprano with more powerful and more



FIG. 12.—TYPE OF STRONG FEMALE SINGER

developed vocal physical powers. It is, relative to the dramatic soprano, what the strong tenor is to the first tenor of opera.

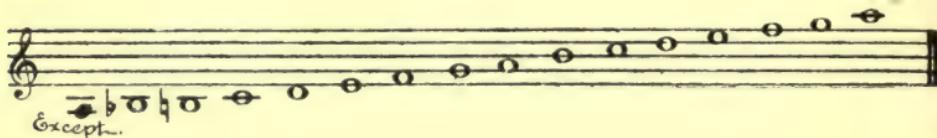
The repertoire of the dramatic soprano is the following: *Norma*, *Lucrezia Borgia*, Leonora in *Il Trovatore*, Amelia in *La Forza del Destino*, Alice in *Robert le Diable*, Chimène in Massenet's

*Le Cid*, Elvire in *Hernani*, Salome in *Hérodiade*, etc.

*Representatives* : Mmes. Mainvielle-Fodor, de Lagrange, Catalani, Sontag, Malibran, Persiani, Cruvelli, Bosio, Penco, Dorus-Gras, Ungher, Schrader-Devrient, de Murzka, etc. (In England, Agnes Nicholls, Gleeson White.)

To-day, in France, the dramatic soprano and the mezzo-soprano appear to be confused and sing the same repertoire, but their respective qualities must not be mistaken and the one taken indistinctly for the other.

#### MEZZI



This voice approaches so much to the soprano if it is placed in a high range of voice, so much to the contralto if it is situated in a low range. Whence the division into mezzo-soprano and mezzo-contralto.

1. The *mezzo-contralto* is that which is met with fairly commonly and which is most made use of by the composers of to-day when they write for the deep female voice ; its compass generally goes from *sol<sup>2</sup>* to *si<sub>b</sub><sup>4</sup>*. And this is the voice vulgarly called *mezzo-voice*.

*Repertoire.* — The repertoire of the mezzo-contralto is more recent than that of the contralto : *Il Trovatore* (Azucena), *Aïda* (Amnéris), *La Favorita* (Léonore), *La Reine de Chypre* (Catarina), *Charles VI.* (Odette), *Le Prophète* (Fidés), *Samson et Dalila* (Dalila), etc.

*Representatives:* La Grossi, Waldmann, Borghi-Mamo, Barlani-Dini, Galetti, etc., in Italy ; Stolz, Viardot, Rosine Bloch, etc., in France. (In England, Muriel Foster.)

2. The *mezzo-soprano* is thus designated from the fact that, although having the deep notes of the mezzo-contralto (these notes, as well as the middle ones, being always less intense), its high register possesses in a certain measure the ease and sparkle of the soprano voice. This voice is very frequent and is met with still more commonly than the mezzo-contralto ; it is called vulgarly, in theatrical parlance, *Falcon voice*. It is, to sum up, the voice, which should be the transition between the dramatic soprano and the contralto, its compass going generally from *la<sup>2</sup>* to *do<sup>5</sup>* (Téqui).

*Repertoire :* *Les Huguenots* (Valentine), *La Juive* (Rachel), *L'Africaine* (Sélika), etc.

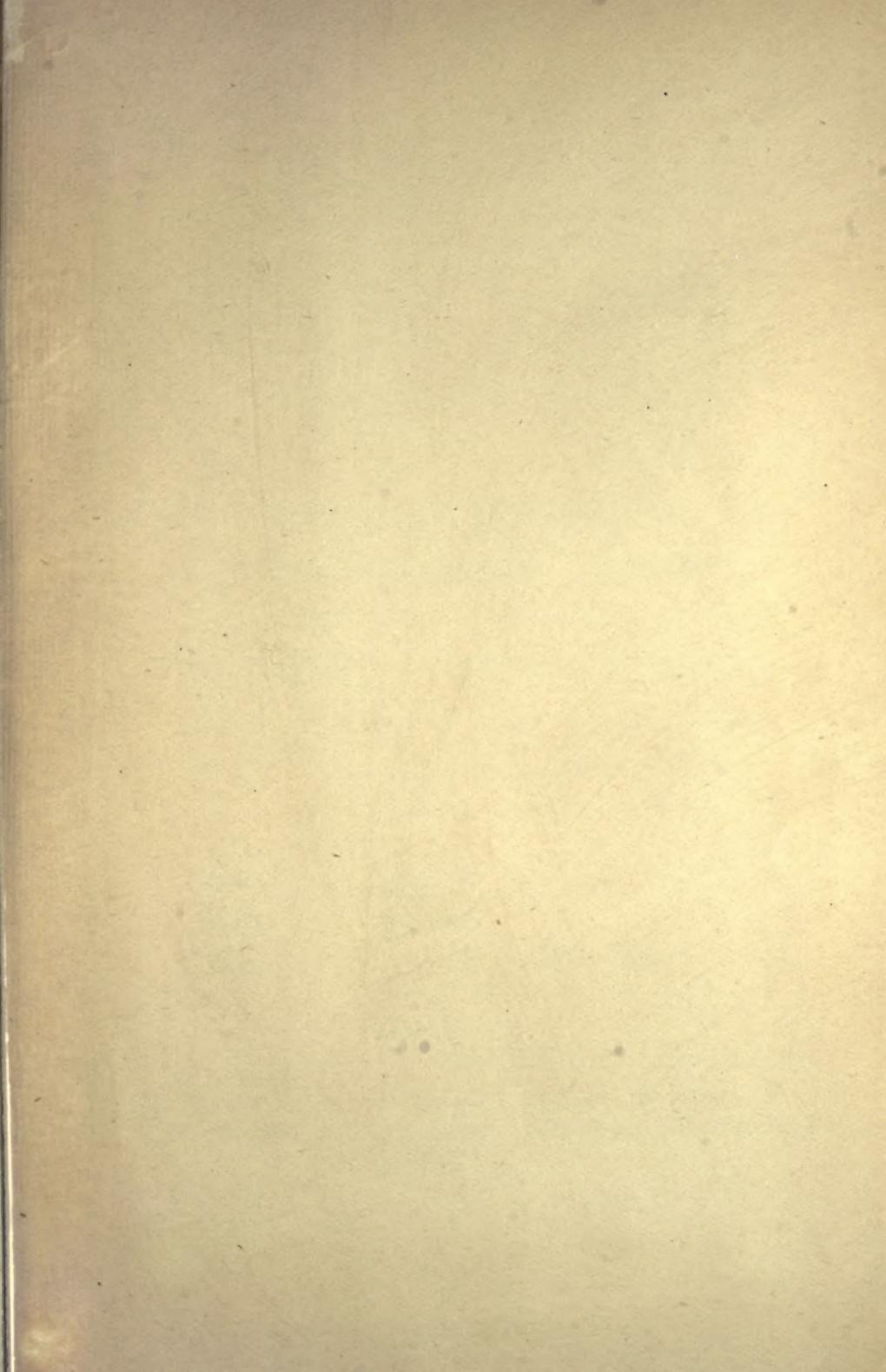
*Representatives :* The type of this style of voice has been that of Mme. Falcon. The most celebrated dramatic mezzo-soprano Italian singers have been Lalande, Grisi, Spezzia, Fricci, Mariani-Masi, etc.

In France, Marie Sasse, Gueymard, Krauss, Eva Dufrane, Hisson, etc. (In England, Kirkby Lunn.)

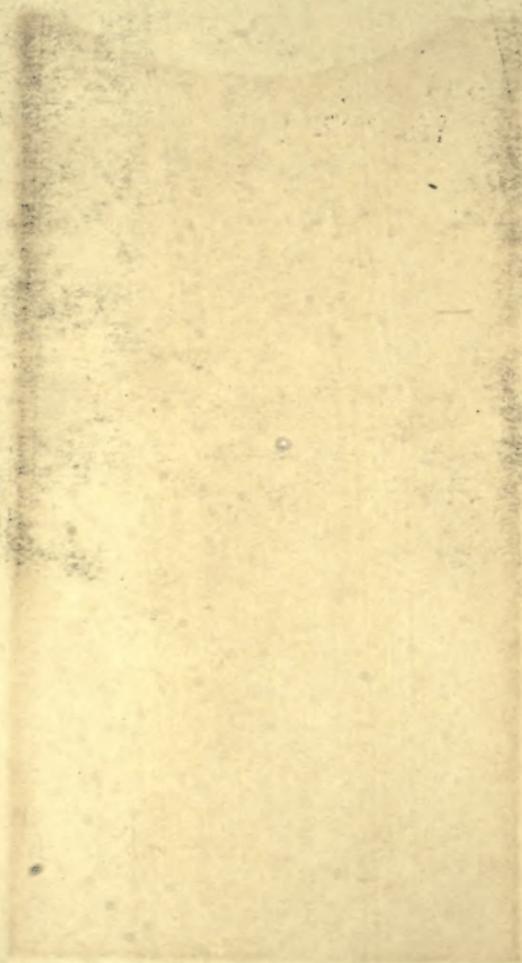
The *Galli-Marié* belongs to the mezzo-soprano style as regards the range of voice ; but, not being truly a dramatic mezzo-soprano, its voice, lighter than the latter, lends itself more easily to the grace and suppleness of opéra-comique ; thus we see it by the parts of Carmen, Mignon, Rose Friquet, Piccinina, in *Fior d'Aliza*, Piccolino, Kaleb in *Lara*, etc., that it has created and by the style to which it has given its name. It was, in short, an opéra-comique mezzo-soprano, as is now the part of Charlotte in Massenet's *Werther*—that is to say, a strong *dugazon-mezzo*, to distinguish it from the *dugazon-soprano* which generally interprets the high parts of pages, such as Urbain (*Les Huguenots*), Siebel (*Faust*), Stefano (*Roméo et Juliette*), etc. (according to Téqui).

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